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COMMITTEE OF EXPERTS ON THE TRANSPORT
OF DANGEROUS GOODS

Sub-Committee of Experts on the
Transport of Dangerous Goods

REPORT OF THE SUB-COMMITTEE OF EXPERTS ON ITS SIXTEENTH SESSION

(Geneva, 5-14 July 1999)

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REPORT

ATTENDANCE

1. The Sub-Committee of Experts on the Transport of Dangerous Goods held its sixteenth session from 5 to 14 July 1999 with Mr. S. Benassai (Italy) as Chairman and Mr. F. Wybenga (United States of America) as Vice-Chairman.

2. Experts from the following countries took part in the session: Australia; Belgium; Brazil; Canada; China, Czech Republic; France; Germany; Italy; Japan, Mexico; Netherlands; Norway; Poland; Russian Federation; South Africa; Spain; Sweden; United Kingdom; United States of America.

3. Under rule 72 of the rules of procedure of the Economic and Social Council, observers from the following countries also took part: Austria; Bahamas; Bulgaria; Finland; Nigeria, Switzerland and Tunisia.

4. Representatives of the following specialized agencies were present: International Civil Aviation Organization (ICAO); International Maritime Organization (IMO) and World Health Organization (WHO).

5. The following intergovernmental organizations were represented: Organization for Economic Co-operation and Development (OECD) and Intergovernmental Organization for International Carriage by Rail (OTIF).

6. Representatives of the following non-governmental organizations took part in the discussion of items of concern to their organizations: European Liquefied Petroleum Gas Association (AEGPL); International Association of the Soap, Detergent and Maintenance Products Industry (AISE); European Chemical Industry Council (CEFIC); European Confederation of Paint, Printing Ink and Artists' Colours Manufacturers' Associations (CEPE); Compressed Gas Association (CGA); European Cylinder Makers Association (ECMA); European Industrial Gases Association (EIGA); Federation of European Aerosol Associations (FEA); Hazardous Materials Advisory Council (HMAC); International Air Transport Association (IATA); International Confederation of Container Reconditioners (ICCR); International Confederation of Drums Manufacturers (ICDM); International Confederation of Plastics Packaging Manufacturers (ICPP); International Council of Intermediate Bulk Container Associations (ICIBCA); International Electrotechnical Commission (IEC); International Fibre Drum Institute (IFDI); International Organization for Standardization (ISO); International Tank Container Organization/Tank Container Association (ITCO/TCA); International Road Transport Union (IRU); International Union of Railways (IUC) and European Secretariat of Manufacturers of Light Metal Packagings (SEFEL).

ADMINISTRATIVE MATTERS

Composition

7. The Sub-Committee noted that, under Council decision 1999/217, dated 6 May 1999, the Czech Republic had become the twenty-third member of the Committee.

Publication of the eleventh revised edition of the United Nations Recommendations on the Transport of Dangerous Goods

8. The Sub-Committee noted with satisfaction that the eleventh revised edition of the United Nations Recommendations was already available in English.

Report of the Secretary-General on the work of the Committee of Experts on the Transport of Dangerous Goods (document E/1999/43)

9. The Sub-Committee noted that this report, and the two draft resolutions drawn up by the Committee at its last session (see ST/SG/AC.10/25), would be discussed by the Council on 23 July 1999.

ADOPTION OF THE AGENDA (ST/SG/AC.10/C.3/31 and -/Add.1 and -/Add.2)

10. The Sub-Committee adopted the provisional agenda prepared by the secretariat after amending it to include late submissions (see informal documents INF.1 and INF.2).

11. The expert from South Africa withdrew her document ST/SG/AC.10/1998/27 (agenda item 5 (d)) and the expert from Argentina, who had excused himself from attending the session, requested that the documents he had prepared should be placed on the agenda for the next session (ST/SG/AC.10/1998/3, ST/SG/AC.10/C.3/1999/3 and, if necessary, ST/SG/AC.10/C.3/R.661 and ST/SG/AC.10/C.3/R.707).

DEVELOPMENT OF PROVISIONS FOR THE TRANSPORT OF GASES

Informal document: INF.22 (Secretariat)

12. The Sub-Committee accepted the application of the Compressed Gas Association and the European Cylinder Makers Association for consultative status.

Documents: ST/SG/AC.10/C.3/30/Add.1 (Secretariat)
ST/SG/AC.10/C.3/1999/24 (EIGA)
ST/SG/AC.10/C.3/1999/35 (Canada)
ST/SG/AC.10/C.3/1999/50 (ISO)

Informal document: INF.11 (United States of America)
INF.25 (Germany)

13. The representative of EIGA submitted a full proposal comprising a revised text for multiple-element gas containers (MEGCs) and new provisions in Part 4 and Chapter 6.2 for gas receptacles. For EIGA the regulations should be limited to setting out essential safety

requirements, while the standards and codes of practice were instruments permitting compliance with the regulations by including these essential requirements and adding detailed information to them.

14. The expert from Germany (INF.25) informed the Sub-Committee of the principles adopted by the RID/ADR/ADN Joint Meeting in respect of reference to standards, namely, that the regulations must contain the basic requirements and that reference was made to dated standards - as a possible means of complying with the regulation - only once it had been ascertained that such standards would meet the essential requirements.

15. The expert from the United States of America considered that in order to ensure harmonization in international transport it would be preferable to refer to acceptable ISO standards and make them mandatory. In his opinion, the essential requirements according to EIGA were not sufficiently technically detailed and he would be unable to accept that gas receptacles constructed according to these requirements and standards which had not been approved by the Committee of Experts could be used in international transport. "Alternative arrangements" to take account of the rapid evolution of technology, like those for portable tanks, would, however, be acceptable. He also considered that work on gas receptacles would require several years and that it would be advisable to give priority to work on receptacles for which ISO standards were already available, and in particular steel cylinders.

16. The majority of experts were of the opinion that the United Nations Model Regulations should establish safety requirements and that standards could only be used if the Model Regulations made them mandatory or referred to them as acceptable standards Opinions were divided between the approach recommended by EIGA (essential requirements and reference to acceptable standards) and that recommended by the United States of America (mandatory application of an ISO standard or of more detailed technical requirements).

17. The Sub-Committee entrusted these questions to a working group which met from 5 to 8 July with Mr. H. Puype (EIGA) as Chairman, with the mandate of considering documents ST/SG/AC.10/C.3/1999/24, ST/SG/AC.10/C.3/1999/50 and INF.11.

Report of the Working Group on Gas Receptacles and Multiple Element Gas Containers (MEGCs)

Informal document: INF.38

18. The Sub-Committee considered the report of the Working Group reproduced in annex 1 (ST/SG/AC.10/C.3/32/Add.1) and welcomed the progress made which made it possible to envisage concluding the work at the close of the present biennium.

19. In paragraph 6 several experts were opposed to the proposal to introduce a definition of "highly toxic gas" since this definition was not necessarily compatible with the overall work of harmonization and was liable to introduce a new criterion of toxicity on inhalation, which had not been accepted for liquids. This proposal should therefore be the subject of a specific written proposal.

20. In paragraph 10, several experts said that pressure relief devices were permitted in the IMDG Code and RID/ADR for pressure receptacles containing very toxic gases and therefore entered a reservation concerning the working group's proposal.

21. The expert from Belgium expressed surprise at the proposal by the United States of America (paragraph 17) to extend the period between inspections from 3 to 5 years for corrosive toxic gases since they were particularly dangerous. The expert from the United States of America indicated that this frequency of inspection had been used safely for many years and he would provide additional supporting data at the next session.

22. The experts from Germany and Belgium were not in favour of paragraph 23, considering that it should be possible to use several different standards provided that the essential requirements were met. Several experts considered on the contrary that paragraphs 22 and 23 reflected the basic objective of the work which was to permit the mutual acceptance of gas receptacles in international multimodal transport, which would only be possible if the standards were approved by the Committee of Experts.

23. In paragraph 38 some experts considered that the introduction of an impact test in standard ISO 1496-3 should not call in question equipment which had undergone impact tests in accordance with the standards already accepted and quoted in Chapter 6.7 (e.g. see 6.7.2.19.1). The expert from the United States of America said that the work on standard ISO 1496-3 took into account test conditions in the currently referenced standards. He would in due course submit a proposal for the amendment of Chapter 6.7.

24. The Sub-Committee decided that the Working Group would be reconvened during the next session for consideration of the proposals contained in its report (see ST/SG/AC.10/C.3/32/Add.1) and of any related new document.

Leakproofness test for aerosols and small receptacles for gases

Document: ST/SG/AC.10/C.3/1999/23 (FEA)

25. Generally speaking, the Sub-Committee was not opposed to the United Nations Model Regulations proposing an alternative method to the water bath for aerosols but the majority of experts considered that it was not appropriate, in the context of international transport, to refer to the competent authority for test approval. FEA was therefore invited to submit a test proposal which could be internationally recognized.

Amendments to special provision 63

Documents: ST/SG/AC.10/C.3/1999/26 (United Kingdom)
ST/SG/AC.10/C.3/R.590 (United States of America)

26. Several experts supported the proposal by the United Kingdom, but it was pointed out that the consequences for air transport were not fully taken into account, and according to RID/ADR, there were numerous instances of the classification of aerosols which were also not taken into account in the United Nations Model Regulations.

27. In view of the remarks made by various experts and since the matter was to be studied by ICAO at the forthcoming session of its Dangerous Goods Panel, the expert from the United Kingdom said that he would prepare a new proposal for the next session.

TRANSPORT IN BULK IN PORTABLE TANKS AND FREIGHT CONTAINERS

Informal document: INF.10 (United States of America)

28. The proposals concerning provisions for carriage in tanks of substances assigned to UN Nos. 2740, 1556 and 2994, and the addition of special provisions TP 30 to UN Nos. 2531 and 2579 and TP 31 to UN Nos. 1381, 1422, 1428 and 2257 were adopted (see annex 2) in accordance with the decisions made by IMO.

Transport of solid substances in tanks and containers

29. The Sub-Committee noted that the expert from Germany was preparing proposals on the subject for the December 1999 session.

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Documents: ST/SG/AC.10/C.3/1997/58 (CEPE)
ST/SG/AC.10/C.3/1998/54 (CEPE)
ST/SG/AC.10/C.3/1998/20 (United Kingdom)
ST/SG/AC.10/C.3/1998/36 (FIATA)
ST/SG/AC.10/C.3/1999/37 (CEPE)

30. The Sub-Committee noted that CEPE was working on the subject and was intending to prepare a proposal for the next session.

Document: ST/SG/AC.10/C.3/1999/14 (ICAO)

31. The proposal to amend paragraph 5.4.1.1.3 concerning documentation relating to the carriage of waste was adopted (see annex 2).

Documents: ST/SG/AC.10/1998/33 (Canada)
ST/SG/AC.10/C.3/1999/39 (Canada)

32. The proposal that the subsidiary risks should be reflected in the transport document was adopted in principle. CEPE should take this into account in the consolidated proposal which it was intending to submit at the next session.

33. Several delegations expressed the hope that in the future the UN number should come first in the sequence of information given in the transport document, since in international transport between countries where different languages were used this number was initially more important than the proper shipping name.

34. The expert from the United States of America said that this question should be the subject of a written proposal since it would have important repercussions for industry.

35. The representatives of IATA and HMAC said that the modification of computer programmes would indeed have repercussions of note in terms of costs.

Document: ST/SG/AC.10/1998/42 (Austria)

Informal document: INF.13 (United States of America)

36. The proposal by Austria, as amended by the United States of America, was adopted (see annex 2).

Informal document: INF.26 (Netherlands)

37. In this informal document, the expert from the Netherlands raised the problem of the availability of information on substances being transported in case of an air accident. This will be discussed by the ICAO Dangerous Goods Panel and the report will be transmitted to the Sub-Committee at its next session.

MISCELLANEOUS DRAFT AMENDMENTS TO THE MODEL REGULATIONS ON THE TRANSPORT OF DANGEROUS GOODS

Listing and classification

Hydrazine solutions (UN 2030)

Documents: ST/SG/AC.10/1998/8 (United States of America)
ST/SG/AC.10/C.3/1999/6 (Germany)
ST/SG/AC.10/C.3/1999/7 (United States of America)

38. The United States of America proposal to make provision for three packing groups for aqueous solutions and a flammable liquid label for solutions in Packing Group I with a flash point of 60.5° C or less was adopted. It was pointed out that 80% solutions falling within Packing Group I are commercially available. Since solutions with concentrations lower than 37% do not fall within Class 8, some solutions with concentrations greater than 37% may fall within Packing Group III.

New entries for sea transport

Document: ST/SG/AC.10/C.3/1999/1 (IMO)

Informal document: INF.16 (IMO)

39. The IMO proposal to reinstate entries for sea transport of wet animal or vegetable fibres, wet waste cotton, wet waste textiles and oil rags was adopted (see annex 2).

40. The Sub-Committee also adopted the proposal to add an entry for cargo transport units under fumigation; this entry will cover all modes of transport (see annex 2).

41. The proper shipping name in English ("cargo transport unit") nevertheless gave rise to some controversy, since that term is used only in the IMDG Code. The English term employed in the United Nations Model Regulations is "transport unit", but that has a different meaning in the ADR, where it refers only to a motor vehicle without an attached trailer or to a combination consisting of a motor vehicle and an attached trailer. The problem does not exist in French.

42. It was decided to retain the term used in the IMDG Code for the time being with the possibility of reverting to the matter at a later stage. The applicable special provisions should also be the subject of written proposals.

UN 3166, Engine, internal combustion

Document: ST/SG/AC.10/C.3/1999/10 (ICAO)

43. The proposal to amend the name for this entry was adopted (see annex 2).

UN 2680, Lithium hydroxide, monohydrate

Document: ST/SG/AC.10/C.3/1999/11 (ICAO)

44. The proposal to delete the word "monohydrate" from the name for this entry and to add under 3.1.2 a provision specifying that hydrates of substances may be transported under the proper shipping name for the solid substance was adopted (see annex 2).

Special provisions 119 and 291

Document: ST/SG/AC.10/C.3/1999/18 (United States of America)

45. The proposal to amend special provisions 119 and 291 was adopted (see annex 2).

Solvent free acetylene

Document: ST/SG/AC.10/C.3/1999/30 (Germany)

46. Several experts expressed their support for this proposed new entry. The Sub-Committee agreed to transmit the proposal to the working group on gases to determine the relevant packing instruction. The expert from Germany should also submit a detailed data sheet for the next session, when the proposal will be considered again.

Silicon tetrachloride, propyltrichlorosilane and generic chlorosilane entries

Document: ST/SG/AC.10/C.3/1999/44 (United States of America)

47. The expert from the United States of America proposed reclassifying silicon tetrachloride (UN 1818) and propyltrichlorosilane (UN 1816) in Division 6.1 rather than in Class 8, and creating two new n.o.s. entries, for toxic and corrosive chlorosilanes and for toxic, corrosive and flammable chlorosilanes, in Division 6.1.

48. Some experts considered that the primary hazard of these substances is their corrosiveness and that the lethal nature of exposure to them derives mainly from the corrosive effects on pulmonary tissues rather than from the toxicity of the products. Proposals to revise UN 1816 and UN 1818 had, in any event, already been made by the expert from the United States of America in the past and had been rejected.

49. Other experts considered on the other hand that, since the destruction of pulmonary tissues causes death in animals tested, these substances meet the criteria for Division 6.1 and that the application of the criteria logically implies classification in Division 6.1 with subsidiary risk 8.

50. Each proposal having been put to a vote, the Sub-Committee decided not to reclassify UN 1816 and UN 1818 but agreed to create two new n.o.s. entries in Division 6.1 (see annex 2).

51. The observer for Switzerland said that it was illogical for most of the chlorosilanes specifically listed by name to be classified as corrosive whereas those not listed by name would be classified in Division 6.1.

UN 1062, Methyl bromide

Document: ST/SG/AC.10/C.3/1999/48 (United States of America)

52. The proposal to state that methyl bromide classified as UN 1062 may contain up to 2% chloropicrin was adopted. It was therefore pointed out that mixtures of methyl bromide and chloropicrin classified under UN 1581 contain more than 2% chloropicrin (see annex 2).

Dangerous goods in machinery or apparatus

Document: ST/SG/AC.10/1998/7 (United States of America)

53. The proposal was submitted to a drafting committee and the Sub-Committee adopted new provisions for dangerous goods in machinery or apparatus (see annex 2).

Ammonium nitrate based emulsion

Documents: ST/SG/AC.10/1998/45 (France)
ST/SG/AC.10/C.3/1999/34 (Canada)
ST/SG/AC.10/C.3/1999/47 (Norway)

Informal document: INF.9 (OECD)

54. Several experts supported the principle that the conditions for the carriage of these emulsions should be defined, but it was pointed out that they were of very varied composition and that provision should be made for all possible cases of classification.

55. The Sub-Committee accepted the offer by FEM to convene an informal working group in Norway from 4 to 8 October 1999 to prepare a document for consideration at the next session. The group's mandate was:

(a) to determine appropriate classification criteria;

(b) to analyse the properties of the emulsions so as to determine test methods that could be used to classify them;

(c) to analyse the need for a new test method to better assess the explosive properties of such emulsions;

(d) to propose conditions for carriage, in particular packagings, tanks or IBCs, as appropriate for each type.

Ammonium nitrate fertilizer

Documents: ST/SG/AC.10/1998/32 (Canada)
ST/SG/AC.10/C.3/1999/40 (EFMA)

Informal documents: INF.15 (United States of America)
INF.20 (Canada)

56. After a general exchange of views on the documents submitted in which several experts supported the principle that the number of entries for ammonium nitrate fertilizer should be reduced, the Sub-Committee noted that EFMA was intending to prepare a new detailed proposal for the next session and that the experts from Canada and the United States of America also intended to prepare a joint proposal.

Lithium batteries

Document: ST/SG/AC.10/C.3/1999/8 (South Africa)

57. The Sub-Committee was of the view that the problem raised by South Africa could be resolved by an appropriate footnote in the alphabetical index (see annex 2).

Documents: ST/SG/AC.10/C.3/1999/29 (Japan)
ST/SG/AC.10/C.3/1999/36 (Canada)

Informal document: INF.21 (Canada)

58. After a general discussion of the documents, the Sub-Committee agreed that a new proposal should be prepared by a correspondence group and would be submitted as a joint proposal prepared by Canada and Japan for the next session. The group should

(a) review the risks involved in the transport of lithium batteries;

(b) study the relevance of current provisions according to the different sizes of lithium batteries;

(c) verify whether the current test procedure is clear and comprehensible;

(d) verify whether current test criteria are clear and comprehensible.

Limited quantities

Document: ST/SG/AC.10/1998/12 (CEFIC)

59. The experts were not in favour of the proposal to exclude specifically from paragraph 1.1.1.2 of the Model Regulations pharmaceuticals or animal health products packaged in a form intended or suitable for personal care or household use risk, as that question had already been settled, on a general basis, for all the dangerous goods in Chapter 3.4. However, the proposed addition to paragraph 3.4.8 was supported by the expert from the United States of America.

60. In view of the opinions expressed, the representative of CEFIC withdrew his proposal, but said that the problem of distribution of pharmaceuticals and animal health products was not adequately regulated by existing provisions.

Documents: ST/SG/AC.10/C.3/1999/16 (AISE)
ST/SG/AC.10/C.3/1999/41 (United Kingdom)

Informal documents: INF.5 (United Kingdom)
INF.8 (United States of America)

61. The Sub-Committee acknowledged that the current situation regarding regulations for the transport of dangerous goods packed in limited quantities is not satisfactory, as UN Recommendations are not usually reproduced in the modal regulations. The resulting lack of harmony with regard to labelling, marking, quantities permitted and documentation is harmful to the industry and to trade facilitation.

62. Opinions were sharply divided over documentation requirements; some experts felt that documentation was indispensable, being the only way for the shipper and emergency control or intervention services to know how dangerous goods are carried, while others felt that documentation need not be required especially for local distribution purposes.

63. With regard to marking, some experts supported the United Kingdom proposal to include the UN number, others felt that would not be a satisfactory solution in the many cases where several goods were grouped in the same package. Still others preferred a pictogram or diamond-shaped marking.

64. After a lengthy discussion, the expert from the United Kingdom agreed to submit a new proposal for the following session. The Chairman said that there was no point in reopening the general discussion at the following session and invited the delegations which had specific proposals to submit them in writing.

65. The Sub-Committee agreed that quantities per packaging should be harmonized and that the expert from the United States of America would submit a proposal based on informal document INF.8.

Document: ST/SG/AC.10/C.3/1999/17 (United States of America)

66. The proposal concerning the transport of nitrocellulose membrane filters (UN 3270) in limited quantities was adopted (see annex 2).

Document: ST/SG/AC.10/C.3/1999/38 (Japan)

67. The proposal to bring the provisions on self-reactive substances into line with the provisions on organic peroxides was adopted (see annex 2).

Packagings

Document: ST/SG/AC.10/C.3/1999/9 (South Africa)

68. The expert from South Africa said that she would submit a revised proposal at the following session.

Document: ST/SG/AC.10/C.3/1999/12 (ICAO)

69. The Sub-Committee noted that ICAO has introduced additional restrictions into its Technical Instructions concerning the use of salvage packagings. The Sub-Committee felt that it was not necessary to amend the Model Regulations, as such restrictions need not be considered for the other modes of transport.

Document: ST/SG/AC.10/C.3/1999/13 (ICAO)

Informal document: INF.35 (Secretariat)

70. Taking account of the proposal by ICAO, the Sub-Committee decided to indicate that the various markings for packagings should be clearly separated in order to make them easily identifiable (see annex 2).

"W" marks for large packagings

Document: ST/SG/AC.10/C.3/1999/20 (United Kingdom)

71. The proposal to use the "W" mark for "equivalent" large packagings by analogy with the permitted practice for packagings and IBCs was adopted (see annex 2).

Minimum thickness of drums

Document: ST/SG/AC.10/C.3/1999/22 (Spain)

Informal documents: INF.17 (SEFEL)
INF.34 (ICDM)

72. Following the accidents reported by ICAO and IATA involving thin-walled steel drums meeting the test requirements of the Model Regulations, and noting that commercial competition was encouraging the packaging industry to manufacture increasingly thin drums whose resistance to perforation and ability to withstand transport conditions in general, especially when reused, did

not appear to be satisfactory, the expert from Spain proposed specifying a minimum wall thickness for steel drums.

73. Several delegations confirmed that there were problems with such thin drums and expressed concern about the safety problems that would arise if the trend to reduce wall thicknesses were to persist. Other delegations were not convinced that a problem existed, at least with regard to drums certified as meeting the test criteria.

74. Opinions were in any event divided on what solution to propose. Prescribing a minimum wall thickness would run counter to technological progress, since thin drums could be manufactured to withstand unfavourable transport conditions. Some experts therefore expressed a preference for keeping the system of performance tests, if necessary adding further tests. Other experts requested an improvement of the Spanish proposal on minimum thickness to take into account principally reusable drums.

75. The expert from the United States of America recalled that in the past he had proposed some additional tests (penetration test and vibration test) but they had not been adopted. He further pointed out that the competent authorities had the responsibility to ensure, through inspections and possible sanctions, that packagings certified on behalf of Governments actually met the requirements in Chapter 6.1.

76. It was suggested that information on actual incidents or accidents should be collected and that experts from countries not satisfied with the quality of the testing system should make specific proposals on how to improve it, bearing in mind that a revised Spanish proposal would be presented to the next session.

Deletion of the specific requirement concerning pressure-relief devices for rigid plastics IBCs and composite IBCs with plastics inner receptacles

Document: ST/SG/AC.10/C.3/1999/28 (ICPP)

77. Several experts said that they were unconvinced of the rationale for the proposal. Others felt that pressure-relief devices were not useful because the IBCs in question were deformable, that there was consequently no risk of bursting and that the pressure relief devices would be more likely to cause safety problems in practice. The proposal was adopted (see annex 2).

Vapour pressure limitations for liquids transported in IBCs

Document: ST/SG/AC.10/C.3/1999/32 (ICIBCA)

78. The proposal not to impose vapour pressure limitations in the use of IBCs for transporting liquids was not adopted. The majority of the experts felt that IBCs were not built in accordance with a code for pressurized receptacles and that they were therefore not an appropriate means of carrying substances with a high vapour pressure.

Editorial changes to Chapter 6.5

Document: ST/SG/AC.10/C.3/1999/33 (ICIBCA)

79. The changes had been proposed to take account of the work on standardization currently being performed by the European Committee for Standardization (CEN) concerning packagings and IBCs. However, as some substantive changes had inadvertently been introduced in the text, the ICIBCA representative said that he would submit a revised proposal.

Reconditioned packagings

Document: ST/SG/AC.10/C.3/1999/42 (Italy)

Informal documents: INF.6 (ICCR)
INF.29 (Italy)
INF.36 (Italy)

80. The Sub-Committee agreed, after a discussion of the proposals, to make some changes to paragraphs 6.1.1.4, 6.1.3.2 and 6.1.3.4 (i) (see annex 2).

Unpackaged articles

Informal document: INF.7 (United Kingdom)

81. The expert from the United Kingdom suggested that the competent authorities might approve the carriage of certain large robust, empty, uncleaned and unpackaged articles. The proposal, inter alia, included flexible fuel tanks, as used for the storage of fuel on building sites or for military operations.

82. Several experts welcomed the proposal. Some said, however, that they would like the proposed text to be more explicit. A few experts felt that the proposal should be restricted to Class 3. The expert from the United Kingdom indicated that he would submit a formal proposal at the next session.

Combination IBCs

Informal document: INF.33 (China)

83. The expert from China asked how "combination" IBCs, i.e. flexible IBCs used as outer packagings for several inner packagings, should be treated and presented a draft proposal of amendment to the test requirements for such IBCs.

84. The Sub-Committee stated that IBCs were not normally intended for use as combination packagings. If the IBCs contained inner packagings meeting the requirements of Chapter 6.1, they should be considered as overpacks. If the inner packagings did not fall under Chapter 6.1, the provisions of Chapter 6.6 for large packagings should be applied.

Infectious substances

Diagnostic specimens

Documents: ST/SG/AC.10/1998/47 (Germany)
ST/SG/AC.10/1998/48 (Germany)

Informal documents: INF.24 (United Kingdom)
INF.28 (Germany)

85. The Sub-Committee agreed that the current requirements were difficult to apply in practice for consignments of diagnostic specimens by doctors, often through the postal system, and that they should be simplified so that doctors and analytical laboratories would be able to comply with them.

86. Several experts said that in principle they favoured the approach suggested by the United Kingdom, but since most delegations had not had time to study the informal documents in detail, the experts from Germany and the United Kingdom were requested to cooperate in submitting a new proposal, in consultation also with the experts from WHO.

Hospital waste

Informal document: INF.19 (WHO)

87. The WHO representative emphasized the difficulties of applying the requirements for Division 6.2 to hospital waste and presented a draft proposal being prepared by WHO for a more pragmatic approach.

88. The experts were invited to transmit their comments on the draft to her */ so that a formal proposal could be submitted at the next session.

Toxic by inhalation substances

Document: ST/SG/AC.10/C.3/1999/49 (United States of America)

Informal documents: INF.3 (EIGA)
INF.18 (CEFIC)

89. The expert from the United States of America, recalling that the Committee had decided to prescribe packing instructions P601 or P602 for certain very toxic by inhalation substances, proposed that those instructions should be applicable to all toxic by inhalation substances with the same degree of hazard and that a ratio of volatility to the LC_{50} criterion should be established to assign the substances to instructions P601 and P602.

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*/ *Ms. A. Pruess, E-mail: pruessa@who.ch.*

90. That proposal was supported by several experts, who considered that toxicity by inhalation (Packing Group I) was one of the major risks for transport and that such a risk justified special packing measures.

91. Other experts felt, on the other hand, that packing instructions P601and P602 had been drawn up for substances known from experience to present a very high risk, but that there was no reason to apply them systematically to all substances presenting a danger of toxicity by inhalation in Group I, for which the packagings currently permitted were found to be satisfactory. They feared, moreover, that the United States of America proposal might entail de facto the creation of a new classification criterion.

92. The expert from France said that the United States of America proposal would involve much stricter packing instructions for many substances without proper justification since, in his view, the risk analysis made by the United States of America was debatable. He regretted that the compromise solutions adopted by the Committee for instructions P601 and P602 entailed a significant reduction, at least in Europe, in the level of safety for higher-risk substances because, instead of pressurized receptacles tested at 10 bars, use could now be made of less expensive drums tested at only 3 bars. He felt that it was illogical to try to develop a rational approach for the assignment of instructions P601 and P602 when each of those instructions offered the possibility of using packagings with very different safety levels.

93. The expert from Belgium questioned the need for having two packing instructions for toxic by inhalation substances.

94. The proposal from the United States of America, having been put to the vote, was not adopted.

95. The expert from the United States of America asked whether, in view of the discussion and the vote, the Sub-Committee still wished him to pursue work on developing a rational approach to the assignment of instructions P601 and P602. A majority of the members of the Sub-Committee said that they were in favour of the work being continued, and interested experts were requested to provide their comments to the expert from the United States of America.

Segregation of dangerous goods

Documents: ST/SG/AC.10/C.3/1997/89 (United States of America)
ST/SG/AC.10/C.3/1999/43 (Netherlands)

96. Some experts shared the opinion of the Netherlands that the segregation of dangerous goods should rather be envisaged mode by mode since the objectives of the pertinent requirements differed according to the mode.

97. It was, however, recalled that the Committee had decided to study the question and other experts considered that harmonization would be useful, at least for multimodal transport operations, particularly in containers.

98. The expert from Germany said that an international working group would meet in his country to revise the requirements of the IMDG Code concerning the segregation of packed substances in cargo transport units and segregation between cargo transport units, that this work would be submitted to IMO in February 2000 and that a proposal concerning principles of segregation appropriate for the Model Regulations could be submitted, possibly in the form of an informal document, at the December 1999 session or at latest in official form at the July 2000 session.

99. The Sub-Committee agreed to reconsider the matter once the expert from Germany submitted his proposal.

Miscellaneous proposals

Tests for lighters

Informal document: INF.32 (China)

100. The Sub-Committee noted China's wish to add a new test to section 6.2.3 for lighters and lighter refills. Some experts endorsed the concept contained in the informal document. The Sub-Committee invited the expert from China to make an official proposal with data and examples for the next session.

Document: ST/SG/AC.10/C.3/1999/15 (ICAO)

Informal document: INF.39

101. ICAO's proposals were considered by a working group the conclusions of which were set out in document INF.39. The texts adopted by the Sub-Committee are reproduced in annex 2.

Organic peroxides/Self-reactive substances

Documents: ST/SG/AC.10/C.3/1998/56 (Finland)
ST/SG/AC.10/1998/56 (Finland)

102. The Sub-Committee noted that the observer from Finland and CEFIC would submit a new joint proposal on the carriage of peroxyacetic acid in IBCs and tanks.

Documents: ST/SG/AC.10/1998/13 (CEFIC)
ST/SG/AC.10/C.3/1999/21 (CEFIC)

103. The proposal to add four substances to the list in 2.4.2.3.2.4 was adopted with some drafting changes (see annex 2).

104. The expert from the United Kingdom said that he hoped that the detailed lists of organic peroxides and self-reactive substances would be removed from the Model Regulations in future since it was difficult to keep them up to date and the industry was able to classify these products in accordance with the criteria. The expert from Belgium considered on the contrary that these lists were useful. They made it possible for the industry in different countries to avoid classifying formulations already classified by the Committee.

Explosives

Document: ST/SG/AC.10/C.3/1999/4 (Sweden)

105. The expert from Sweden proposed the inclusion of a new entry in Division 1.4, compatibility group S, for air bag inflators, air bag modules and seat-belt pretensioners, pyrotechnic because he considered that those classified in Class 9 (UN 3268) should in fact be classified as 1.4S for storage and handling purposes.

106. It was recalled that classification of such articles in Class 9 was a compromise resulting from long discussions on the actual danger they presented when carried.

107. The expert from the United States of America noted that over 300 million such items had already been transported safely without any reported incidents. He felt that further adjustment to these requirements for those items would serve to frustrate shipments without benefit to transport safety.

108. The expert from Norway objected to the argument put forward by the expert from the United States of America on the grounds that the fact that accidents did not occur was not relevant when discussing classification.

109. Certain experts supported the proposal by Sweden; some of them considered that the entry in Class 9 should be deleted because it should not be allowed to classify the same article under an entry in Class 9 or under another entry in Division 1.4, compatibility group S.

110. Other experts considered that there was no need to reconsider the existing classification as current experience of transport under the conditions of Class 9 did not reveal any kind of safety problem. They were also opposed to the possibility of classification of the same articles under two different classes and they considered that deletion of the existing entry in Class 9 would require a written proposal.

111. The proposal, having been put to the vote, was not adopted.

Document: ST/SG/AC.10/C.3/1999/5 (Sweden)

Informal document : INF.37 (Sweden)

112. The proposal of amending special provision 235 as revised in INF.37 was adopted (see annex 2).

Document: ST/SG/AC.10/C.3/1999/19 (Norway)

113. The proposal, concerning the addition of provisions on mixed transport of goods of Class 1 with other dangerous goods in Chapter 7.1 was adopted (see annex 2).

114. An oral proposal by the expert from the United States of America to allow goods of Class 9 to be transported with goods of Class 1 was not adopted on the grounds that, due to the variety of miscellaneous goods which can be classified in Class 9, it might be necessary to consider mixed transport on the case by case basis.

Document: ST/SG/AC.10/C.3/1999/45 (United States of America)

115. The proposal to allow additional packagings under certain Class 1 packing instructions was adopted, except for fibre drums (1G) and plywood drums (1D) under P144 because this instruction was applicable to water-activated contrivances (see annex 2).

DRAFT AMENDMENTS TO THE MANUAL OF TESTS AND CRITERIA

Document: ST/SG/AC.10/C.3/1999/2 (Russian Federation)

116. At the request of the expert from the Russian Federation, discussion of this document was deferred to the July 2000 session.

Document: ST/SG/AC.10/C.3/1999/31 (Germany/Canada)

Informal document: INF.14 (United States of America)

117. Certain experts supported the proposal to extend the scope of series 6 type (a) test because they considered that the 6 (c) test is not suitable to determine how well effects from accidental functioning of a packaged substance or article are confined within the package.

118. Other experts recalled that it took four years to revise the test prescription and the criteria for the 6 (c) test and considered that the specific criteria for classifying products to Division 1.4, including compatibility group S, resulting from this work were adequate and did not need further refinement.

119. The proposal, having been put to the vote, was not adopted.

Test results concerning test conditions of testing methods for oxidizing solids

Informal document: INF.12 (Japan)

120. The Sub-Committee took note of the information provided by the expert from Japan.

GLOBAL HARMONIZATION OF SYSTEMS OF CLASSIFICATION AND LABELLING OF CHEMICALS

Hazards to the environment

Document: ST/SG/AC.10/C.3/1999/27 (United Kingdom)

Informal document: INF.27 (Germany)

121. The expert from the United Kingdom presented a proposal for a Chapter 2.9 on the classification of substances dangerous to the environment and consequential amendments to the Model Regulations. The proposal was based on the classification criteria for substances hazardous to the aquatic environment developed by OECD in the context of the global harmonization of systems of classification and labelling of chemicals.

122. Most experts supported the principle of the proposal, and the Sub-Committee agreed that the criteria to be retained for transport purposes were those described in paragraph 2.9.2.3.1 of the proposed Chapter 2.9, although the expert from Germany considered that some chronic effects (box 7 in the OECD proposal) should not be taken into account.

123. Several experts considered that the text of this Chapter 2.9 should be simplified and some details of an explanatory nature could be deleted or replaced by a reference to the OECD Guidance document (still under preparation).

124. Several experts considered that it would not be appropriate to introduce new provisions on the carriage of substances hazardous to the environment in the Model Regulations as long as the work on classification of mixtures and on harmonized labelling has not been completed; others believed on the contrary that provisions concerning substances could already be introduced and supplemented at a later stage.

125. Several experts expressed the view that the introduction of criteria for classification would not suffice because this would oblige all chemical producers to classify all substances and mixtures they offer for transport; they considered that a list of substances known to meet the criteria should be prepared and made available so that the future new provisions might be complied with more easily without unnecessary testing and re-testing.

126. Other experts preferred to leave the responsibility of classification to the industry, including for substances listed in Chapter 3.2, because elaboration and up-dating of such lists would be a serious burden for the Committee.

127. The expert from China said that dangerous goods were carried in large quantities by inland waterways, and that the classification criteria for aquatic pollution should be more severe than those existing for maritime pollution because of the risk of pollution of drinking water.

128. With respect to consequential amendments, a member of the secretariat recalled that, while harmonization of classification criteria was necessary for harmonization but might not be sufficient in practice, harmonization of transport conditions (labelling, marking, packing, etc.) was as important for multimodal transport. He recalled that the essential requirements for maritime transport of such substances were contained in Annex III of the MARPOL Convention, which required that the marine pollution potential of such substances be identified by a mark on packages and by a specific mention in the transport document, and that the location of such substances on board a ship be identified in the dangerous goods manifest or a stowage plan. He thought that if harmonization had to be achieved, this should be taken into account in the Model Regulations.

129. Considering the obligation of all United Nations bodies and specialized agencies to support the globally harmonized system, the observer from Bahamas considered that Annex III of MARPOL could be amended as necessary if there were contradictions with the Model Regulations, in this respect.

130. It was agreed to keep document ST/SG/AC.10/C.3/1999/27 on the agenda of the next session and to invite experts to provide comments or suggested changes as deemed necessary in writing. The expert from the United Kingdom would consider the need to present a revised version of the document for the next session.

Document: ST/SG/AC.10/C.3/1999/46 (United States of America)

131. The expert from the United States of America said that in the OECD proposal for harmonized criteria, the United States of America delegation had proposed an additional criterion of toxicity level of 100 ppm for the transport of large volumes (more than 3000 litres) and this had been included in the OECD proposal. Therefore, he was considering a proposal to add this criterion to the United Kingdom proposal and was interested in the views of the Sub-Committee.

132. Certain experts considered that this criterion in Annex II of the MARPOL Convention existed mainly in the context of operational (and not accidental) discharges of substances from chemical tankers into the sea, and was not applicable to maritime carriage in bulk in tank-containers or tank-vehicles which was considered as carriage in packaged form subject to Annex III of MARPOL.

133. Although some experts recognized that the quantity carried was a factor of risk, there was not much support for this additional criterion which is not presently specified in international transport regulations applicable to tank-containers and tank-vehicles.

Classification of mixtures

Informal document: INF.31 (Chairman)

134. The Sub-Committee took note of the information provided by the representative of OECD on the work of his organization in that respect.

135. With respect to the questions posed by the Chairman in INF.31, the majority of the Sub-Committee was in favour of maintaining a calculation method for acute toxicity of mixtures when data on active substances was available. Other approaches such as cut-off values could also be accepted. The general view was that the methods used for classification of mixtures should also be applicable to the classification of wastes. For mixtures containing environmentally hazardous substances, cut-off values (e.g. 1% or 10% as in the IMDG Code) seemed preferable because calculation methods with criteria such as log Po/w might be too complicated in practice.

Hazard communication

Informal document: INF.23 (Chairman)

136. The Sub-Committee was informed of the outcome of the session of the ILO Working Group on Hazard Communication held in Dublin from 21-23 June 1999.

137. With regard to the questions raised by the Chairman, most experts considered that it was premature to express any view because there was not yet any concrete proposal from the ILO Working Group.

138. The Sub-Committee considered that, in principle, transport experts participating in the ILO Working Group session should explain the existing transport provision and promote the benefit of using these as a basis of the harmonized system because they have already been successfully used worldwide for many years. Any change to the existing transport labelling system proposed by the ILO Working Group would be considered as appropriate.

Co-ordinating Group for the Harmonization of Chemical Classification Systems (Dublin, 21-22 June 1999)

Informal document : INF.30 (Chairman)

139. The Sub-Committee noted the information provided by the Chairman.

140. For the phased implementation of the globally harmonized system, the Sub-Committee noted that certain delegations of the Co-ordinating Group would prefer to wait until the work on global harmonization has been fully completed before starting implementing the system as a whole package. However, such an approach for transport regulations would mean a complete revision of all downstream requirements at the same time, and this extensive work might require a long period time. Therefore, it was considered preferable to start implementing elements of the system already available as soon as possible, and to introduce at least the new criteria for classification of new substances, even though is was recognized that re-classification of existing substances might need more time and coordination.

141. Several experts were in favour of developing a database containing relevant data on substances to be classified. Other experts considered that this work would require too many resources. The question as to whether such a database would contain an internationally recognized list of classified substances or only various relevant data permitting classification of substances would have to be further debated if there were an agreement for such a database. The expert from Canada suggested that the development of such a database be left to commercial companies currently involved in this work.

OTHER BUSINESS

Arrangements for the next session

142. The Sub-Committee noted that the next session has been scheduled for 6-17 December 1999 but could be shortened by the secretariat (6-15 December or even 6-10 December) depending on the number of proposals received by the deadline (17 September 1999).

143. The agenda items will be the same as for this session except that item 5(j) (explosives) will be deleted and that there should be a UN/ILO Joint Working Group session on the flammability of aerosols.

144. The following documents were carried forward to the next session:
ST/SG/AC.10/1998/3, -/1998/5, -/1998/6;
ST/SG/AC.10/C.3/1998/20;
ST/SG/AC.10/C.3/1999/3, -/1999/27, -/1999/30

145. Document ST/SG/AC.10/C.3/1999/2 was carried forward to the July 2000 session.

ADOPTION OF THE REPORT

146. The Sub-Committee adopted the report on its sixteenth session and the annexes thereto.

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COMMITTEE OF EXPERTS ON THE TRANSPORT
OF DANGEROUS GOODS

Sub-Committee of Experts on the
Transport of Dangerous Goods

REPORT OF THE SUB-COMMITTEE OF EXPERTS ON ITS SIXTEENTH SESSION

(Geneva, 5-14 July 1999)

Addendum 1

Annex 1

Report of the Working Group on Gas Receptacles and Multiple Elements Gas Containers (MEGCs)

General

1. The Working Group on Gas Receptacles and MEGC's met from 5 July to 8 July 1999 under the chairmanship of Mr. H. Puype (EIGA). Representatives of Canada, France, Germany, the United Kingdom, the United States of America, ISO, CGA, HMAC, ECMA, AEGPL and EIGA participated in the meeting.

2. The objective of the working group was to have a first reading of document ST/SG/AC.10/C.3/1999/24 taking into account informal document INF.11 providing comments from the United States of America, ISO submission ST/SG/AC.10/C.3/1999/50 and the submission from Canada, ST/SG/AC.10/C.3/1999/35. The outcome of the discussions is reflected in the annexed proposals 1 to 7.

Proposal 1: Inclusion of additional Definitions in Part 1

3. The Working Group agreed on the inclusion of the proposed definitions with minor editorial changes. The expert from the United States of America indicated that they preferred not to use the term "drum" to describe welded cylinders with a capacity greater than 150 litres. The term "gas drum" was put between brackets. EIGA indicated that a joint proposal with CEFIC had been introduced for the next Joint Meeting of ADR/RID in order to set the limit at 3000 litres instead of 1000 litres.

4. The Working Group felt it was necessary to include a definition for test pressure.

Proposal 2: Definitions and General provisions in Part 2

5. The chairman of the ISO Technical Committee TC58 confirmed that in the review of ISO standard 10286 on terminology the new cut-off temperatures as proposed by EIGA would be incorporated. The working group adopted the definitions. These new definitions affect 4 gases, namely 1982 tetrafluoromethane, compressed, 2451 nitrogen trifluoride, compressed, 1859 silicon tetrafluoride, compressed and 1008 boron trifluoride, compressed, where the proper shipping names will lose the qualification "compressed".

6. The group proposes to introduce a definition of "highly toxic gases" to replace the phrase "gases with an LC_{50} lower than or equal to 200 ppm".

Proposal 3: Special packing provisions for dangerous goods of class 2 in chapter 4.1

7. The expert from the United States of America wants to review the provisions of ISO 11621 on the change of gas service for pressure receptacles to ensure that there is no conflict with procedures used in North America.

8. It was agreed that the requirements of the drop test for valve protection of ISO 11117:1998 were at least as stringent as the requirements proposed by the United States of America in INF.11. Hence the reference to ISO was confirmed and the brackets lifted.

9. The Working Group agreed that additional data should be tabled to assess the need for pressure relief devices. Risk assessments, taking into account the nature and the use of the gas, the transport conditions as well as emergency response, will be circulated amongst the members before the December meeting where a decision should be made.

10. The Working Group confirmed that pressure relief devices should not be fitted on pressure receptacles containing highly toxic gases.

11. The Working Group decided to change the range of automatic opening of pressure-relief devices from 90-110% to 100–120% of the test pressure. It was noted that this change may affect the acoustic emission test and might need further investigation. An additional provision on fusible plugs was added.

12. The Working Group agreed that a uniform temperature of 65 °C should be retained as a maximum temperature to be considered for compressed, high and low pressure liquefied gases.

13. The formulae in P200 were put between brackets to allow CGA, EIGA and the experts from Germany to validate them.

14. The expert from the United States of America noted discrepancies in some values of filling ratios and will circulate the comparative tables. He will liaise with BAM and EIGA experts to validate the values to be retained.

15. At the request of the expert from the United States of America new provisions have been added between brackets for the receptacles containing highly toxic gases to safeguard against mechanical impact.

16. The Working Group agreed to add special requirements in packing instruction P200 to cover the risk of hydrogen embrittlement for the gases identified in ISO 11114-1 on the compatibility of gases with cylinders.

17. The expert from the United States of America proposed to raise the periodic inspection for gases of division 2.3 with a subsidiary corrosive risk from 3 to 5 years taking into account their positive experience. Experts from the United States of America and European countries will provide data to support the proposed extended period. The expert from the United States of America proposed to make a review of the periodicities as proposed in the document and the current periodicities in the United States of America and to circulate it before the next meeting. It was noted that no periodicity is actually specified when gas receptacles are used to contain liquids from other classes.

18. For special provision "k" of P200, the extension to 10 years for the use of aluminium alloys has been made conditional to the passing of a stress corrosion test as described in ISO 7866.

19. Some members asked to put special requirement "m" relating to the extension of the interval periods for LPG receptacles between brackets until further discussion with the industry concerned.

20. The whole of P203 was put between brackets. The expert from the United States of America will verify its conformity with the ICAO Technical Instructions.

Proposal 4: Requirements for the construction and testing of pressure receptacle for gases

21. It was agreed that the general requirements for design and construction are necessary as a regulatory framework to cover all pressure receptacles. The provisions need further investigation taking into account e.g. ISO TR 13763 Safety and Performance criteria for seamless gas cylinders (copies distributed at the meeting). The expert from the United States of America offered to circulate additional requirements before 15 September 1999 in advance of the next ISO October meeting (20-24 September) dealing with the same subject.

22. The Working Group agreed that standards other than ISO presenting the same or a higher level of safety could be incorporated in the reference list upon review by the experts of the Working Group. However the intent is not to include every standard in existence to-day.

23. The UN mark can only be applied if the appropriate standards in the reference list are used for the design, construction and testing of the pressure receptacles. The UN mark will allow free international multi-modal transport.

24. The provisions related to the service equipment of cryogenic receptacles was put between brackets. EIGA will provide the expert from the United States of America with the relevant CEN standard.

25. There was no consensus as to the exclusive use of Ultra Sonic Testing for the periodic inspection of high strength steel receptacles.

26. The Working Group agreed to include the requirement for an additional marking to indicate hydrogen embrittlement compatibility.

27. The Working Group agreed to move requirement "g" of 6.2.1.6.3 on the marking of the product name of non-refillable receptacles to Part 5.

28. Canada will circulate the ISO CD 14600 on international Quality Assurance systems for gas cylinders to the members of the group.

29. Based on the ISO document, the expert from United States of America and EIGA will prepare proposals for the provisions on the accreditation of authorised bodies.

Proposal 5: proposed text for Part 5

30. The Working Group agreed that the cylindrical part of very small cylinder could also be used for labelling.

Proposal 6: proposed text for MEGC's in Part 4

31. The Working Group agreed to remove the redundant paragraphs put between brackets.

32. The expert from the United States of America expressed concern about the provisions for the transport of toxic gases in bundles in accordance with 4.2.4.9.4 but is ready to reconsider its position after examination of the proposed standards for bundles. EIGA will provide copies of the CEN standards in preparation.

Proposal 7: Requirements for the design, construction, inspection and testing of multiple-element gas containers (MEGCs) intended for the transport of non-refrigerated gases

33. Several definitions have been deleted because they have been transferred into Part 1.

34. The provisions of paragraph 6.7.5.2.12 bear no relevance to MEGC's and have been deleted.

35. The provisions for service equipment were reviewed, brackets lifted, sentences deleted. The Working Group put 6.7.5.3.4 between brackets for further investigation on how to comply with the requirements in the case of MEGC's. No agreement was yet reached on the number of isolation valves to be installed for the transport of flammable gases. The expert from the United States of America agreed to consider the EIGA arguments on the hierarchy of safety hazards and related control measures. The modified provisions proposing a lower limit of 3000 litre remain between brackets.

36. A distinction on the marking of pressure-relief devices was made between on one hand the spring loaded pressure-relief devices and on the other hand the frangible disk; the latter not offering enough space to accommodate extensive marking.

37. The Working Group agreed to remove the superfluous examples in the requirements for the protection of the MEGC's and make a close link to ISO 1496 in the definition of the MEGC. The expert from the United States of America will check the suitability of the ISO standard before 15 September 1999.

38. The expert from the United States of America noted that in the ISO 1496-3 currently under review impact test were being considered and will propose to refer to them in the next meeting rendering the reference to the various railways methods redundant.

39. The Working Group agreed that the elements and the related pressure equipment are to be inspected at the periodic intervals and according to the prescriptions defined for the elements. MEGC's shall undergo visual examination at not more than 5 years intervals.

* * * * *

Proposal 1

Proposed texts : 1.2.1 Definitions

The following definitions should be added at the appropriate places.

Bundles of cylinders are assemblies of cylinders held firmly together and which are interconnected by a manifold and transported as a unit. The total water capacity shall not exceed 3000 litres;

Cylinders are transportable pressure receptacles of a capacity not exceeding 150 litres;

Cryogenic receptacles are transportable thermally insulated receptacles closed or not for refrigerated liquefied gases of a capacity of not more than 1000 litres;

Multiple-element gas containers (MEGC's) are multimodal assemblies of cylinders, tubes and bundles of cylinders which may be interconnected by a manifold and which are assembled within a framework with overall dimensions in accordance with ISO 668 and corner fitting in accordance with ISO 1161.They are used for the transport of gases of Class 2. The multiple-element gas container includes service equipment and structural equipment necessary for the transport of gases;

[Gas drums] are welded transportable pressure receptacles of a capacity exceeding 150 litres and of not more than [1000] litres, (e.g. cylindrical receptacles equipped with rolling hoops, receptacles on skids and receptacles in frames);

Tubes are seamless transportable pressure receptacles of a capacity exceeding 150 litres and of not more than 3000 litres;

Pressure receptacles are cylinders, tubes, pressure drums, closed cryogenic receptacles and bundles of cylinders";

Filling ratio means the mass of liquefied gas in kg. per litre water capacity(see ISO definition);

Settled pressure is the pressure of a gas at a uniform temperature;

Working pressure is the settled pressure of a compressed gas at the reference temperature of 15 °C in a full receptacle;

Test pressure is the required pressure applied during a pressure test;

Proposal 2

2.2.1 Definitions and general provisions

Paragraph 2.2.1.2 shall be replaced with the following text:

2.2.1.2 The transport condition of a gas is described according to its physical state as :

(a) ***Compressed gas*** - a gas which when packaged under pressure for transport is entirely gaseous at -50 °C. This category includes all gases with a critical temperature below -50 °C

(b) ***Liquefied gas*** - a gas which when packaged under pressure for transport is partially liquid at temperatures above -50 °C. A distinction is made between:

High pressure liquefied gas - gases with a critical temperature between -50 °C and +65 °C

Low pressure liquefied gas - gases with a critical temperature above +65 °C

(c) ***Refrigerated liquefied gas*** - a gas which when packaged for transport is made partially liquid because of its low temperature

(d) ***Gas in solution*** - a gas which when packaged under pressure for transport is dissolved in a solvent

Note: The existing text has been adopted for cut-offs in critical temperature to harmonise with ADR/RID and ISO standard 10286 on terminology which is actually under review.

Add a second note at the end of 2.2.2.1 (c) :

Note: Gases with a LC_{50} lower than or equal to 200 ppm are referenced as "highly toxic gases".

Proposal 3

4.1.6 Special packing provisions for dangerous goods of Class 2

4.1.6.1 ***General requirements***

4.1.6.1.1 Pressure receptacles, including their closures, shall be selected to contain a gas or a mixture of gases according to the requirements of section 6.2.1.2 "Materials of pressure receptacles" and the requirements of the specific packing instructions of section 4.1.4.2. This section also applies to pressure receptacles which are elements of MEGCs.

4.1.6.1.2 Refillable pressure receptacles shall not be filled with a gas or gas mixture different from that previously contained unless the necessary operations of emptying, purging and evacuation have been performed. [The provisions of ISO 11621:1997 shall be considered.]

4.1.6.1.3 Pressure receptacles with the exception of open cryogenic receptacles, including their closures, shall conform to the design, construction, inspection and testing requirements detailed in section 6.2. When outer packagings are prescribed, the pressure receptacles shall be firmly secured therein. Unless otherwise specified in the detailed packing instructions, one or more inner packagings may be enclosed in an outer packaging.

4.1.6.1.4 Valves shall be protected from damage which could cause release of the contents of the pressure receptacle, if the pressure receptacle falls during storage, transport or handling, by one of the following methods:

(a) Valves are placed inside the neck of the pressure receptacle and protected by a screw-threaded plug;

(b) Valves are protected by caps. Caps shall possess vent-holes of sufficient cross-sectional area to evacuate the gas if leakage occurs at the valves;

(c) Valves are protected by shrouds or guards;

(d) Valves are designed and constructed in such a way that they are inherently able to withstand damage without leakage of product;

(e) Valves are placed inside a protective frame;

(f) Pressure receptacles are carried in protective boxes or frames.

For pressure receptacles with valves as described in (b), (c) and (d), the requirements of ISO 11117:1998 shall be considered.

4.1.6.1.5 Pressure receptacles, containing pyrophoric gases and very toxic gases shall have their valve openings fitted with gas-tight plugs or cap nuts which shall be made of a material compatible with the contents of the pressure receptacle.

4.1.6.1.6 Pressure receptacles may be transported after the expiry of the time-limit set for the periodic inspection prescribed for the purpose of undergoing the inspection. Pressure receptacles shall not be charged or filled after they become due for periodic inspection.

4.1.6.1.7 Refillable pressure receptacles shall be periodically inspected according to the provisions of P 200 and P 203.

4.1.6.1.8 The following requirements of the general conditions of packing are considered to have been complied with if the following standards, as relevant are applied:

Applicable sections	Reference	Title of document
4.1.6.1.2	ISO 11621: 1997	Gas cylinders: Procedures for change of gas service
4.1.6.1.5	ISO 11117:1998	Valve protection caps and valve guards for industrial and medical gas cylinders- design, construction and tests

4.1.4.1 Insert the following packing instructions

P200	**Packing Instruction**	P200

This packing instruction applies to Class 2 compressed and liquefied gases. The general packing requirements of 4.1.6.1 shall be met. The following types of pressure receptacles are authorized:

Cylinder, tubes, pressure drums and bundles of cylinders.

200(a) Pressure receptacles shall be closed and leakproof as to prevent escape of the gases. Pressure receptacles containing very toxic gases as specified in the table shall not be equipped with any pressure-relief device. [Other pressure receptacles shall be fitted with a pressure-relief device where specified by the competent authority.] The bursting component of the pressure-relief device shall open automatically at a pressure between 100 and 120% of the test pressure. Where fusible components are used, an appropriate temperature range for functioning shall be specified by the competent authority (see CGA pamphlet S.1.1 and ISO 3807-2 for acetylene cylinders).

200(b) The following tables:
- identify the types of pressure receptacles authorised for a gas;
- identify the test pressure, the filling ratio and the maximum water capacity for the various gases, as well as restrictions concerning very toxic gases;
- refer to additional requirements that are specific to a gas.

200(c) For compressed gases, the working pressure shall be not more than two thirds of the test pressure of the pressure receptacles. In no case shall the internal pressure at 65 °C exceed the test pressure.

200(d) For high pressure liquefied gases, the filling ratio shall be such that the internal pressure at 65 °C does not exceed the test pressure of the pressure receptacles.

200(e) For high pressure liquefied gases and gas mixtures with insufficient thermodynamical and physical data, the maximum filling ratio (FR) shall be determined as follows:

[Formula]

where FR = maximum filling ratio (in $kg.l^{-1}$)
d_g = gas density (at 15 °C, 1 bar)(in $g.l^{-1}$)
P_h = minimum test pressure (in bar)

[Formula]

If the density of the gas is unknown, the maximum filling ratio shall be determined as follows:

[Formula]

where FR = maximum filling ratio (in $kg.l^{-1}$)
P_h = minimum test pressure (in bar)
MM = molecular mass (in $g.mol^{-1}$)
R = $8{,}31451 \cdot 10^{-2}$ $bar.l.mol^{-1}.K^{-1}$ (gas constant)

For gas mixtures the average molecular mass is to be taken, taking into account the volumetric concentrations of the various components;

P200	Packing Instruction (cont'd)	P200

200(f) For low pressure liquefied gases, the maximum mass of contents per litre of capacity (filling factor) equals 0.95 times the density of the liquid phase at 50 °C; in addition, the vapour phase shall not disappear below 60 °C. The test pressure will be at least equal to the vapour pressure of the liquid at 65 °C, minus 100 kPa (1 bar).

200(g) For pure low pressure liquefied gases with insufficient thermodynamical or physical data the maximum filling ratio shall be determined as follows:

[Formula]

where FR = maximum filling ratio in $kg.l^{-1}$
BP = boiling point (in Kelvin)
d_l = density of the liquid at boiling point (in $g.l^{-1}$)

200(h) For acetylene, dissolved, UN 1001, once equilibrium has been achieved at 15 °C, the working pressure shall not exceed the value prescribed by the competent authority for the porous mass. The quantity of solvent and the quantity of acetylene shall likewise correspond to the figures specified in the approval.

200(i) Refillable pressure receptacles shall be subjected to periodic inspections in accordance with the provisions of section 6.2.

200(j) If special requirements for certain substances do not appear in the table below, periodic inspections shall be carried out:

(a) Every [5] years in the case of receptacles intended for the carriage of gases of division 2.3 with a subsidiary corrosive risk;

(b) Every 5 years in the case of receptacles intended for the carriage of gases of division 2.3 other than those included in (a);

(c) Every 10 years in the case of receptacles intended for the carriage of gases of division 2.1 and of division 2.2.

200(k) Keys for the column " receptacles"

(1) Cylinders;
(2) Tubes;
(3) Pressure drums;
(4) MEGC;
(5) Bundles of cylinders.

200(l) Keys for the column "Special requirements":

a: Aluminium alloys shall not be in contact with the gas (see also ISO 11114-1).

b: Valves made of copper shall not be used (see also ISO 11114-1).

c: Metal parts in contact with the contents shall not contain more than 70% copper (see also ISO 11114-1).

d: A pressure receptacle shall not contain more than 5 kg of the gas.

e: The valve outlets shall be fitted with plugs or cap-nuts ensuring gas-tightness.

P200	Packing Instruction (cont'd)	P200

g: The use of test pressures and filling ratio combinations other than those indicated are permitted provided that the developed pressure at 65 °C does not exceed the test pressure of the receptacle (re. 200(d)).

h: If a non-monolithic material is used as a porous mass, the interval between inspections shall be maximum of 5 years.

i: The maximum filling ratio shall be in accordance with the figures specified in the approval.

j: The test pressure and filling ratio shall be calculated in accordance with the requirements of 200(d) and 200 (e).

k: The interval between tests may be extended to 10 years when the pressure receptacles are made of aluminium alloys.

l: Each cylinder within a bundle shall be fitted with an individual valve that shall be closed during transport.

[m: The interval between inspections for steel cylinders may be extended to 15 years:

(a) with the agreement of the competent authority (authorities) of the country (countries) where the periodic inspection and the transport take place; and

(b) in accordance with the requirements of a technical code or a standard recognised by the competent authority, or standard ISO/DIS 10464 "Liquefied petroleum gas (LPG) cylinders - Periodic inspection and testing".]

n: a pressure receptacle with a test pressure greater than or equal to 200 bar shall be used unless the receptacle is shipped in a secondary packaging or calculation shows an equivalent resistance to mechanical impact.

o: compatibility with the material should be checked when steel receptacles with a tensile strength above 950 Mpa are to be used (sese ISO 11114-1).

z: In the case of pressure receptacles for the transport of gases under a N.O.S. position, the following requirements shall be complied with as applicable:

(1) The materials of which the pressure receptacles and their accessories are made shall be compatible with the contents and shall not form harmful or dangerous compounds therewith.

(2) The test pressure and filling ratio shall be calculated in accordance with the requirements of paragraphs 200 (c), 200 (d) and 200 (e).

(4) Very toxic gases and gas mixtures shall not be transported in tubes and pressure drums.

(5) The valves of pressure receptacles for toxic gases and gas mixtures with a LC_{50} less than 200 ppm or for pyrophoric gases or flammable mixtures of gases containing more than 1% of pyrophoric compounds shall be fitted with gas tight plugs or cap-nuts. When these pressure receptacles are manifolded in a bundle, each of the pressure receptacles shall be fitted with an individual valve that shall be closed during transport.

(6) The necessary steps shall be taken to prevent dangerous reactions (i.e. polymerisation, decomposition) during transport. If necessary, stabilisation or addition of an inhibitor is required.

Note: The table will be rearranged in UN number order pending comments on content and layout to be provided by the participants.

Identification No	Name of the substance or article	Receptacles	TEST			FILLING	Special Requirements
			PRESSURE		PERIOD (years) */	MAX. FILL. ratio kg/l or MPa or Vol %	
			X working pressure	MPa			
1002	AIR, COMPRESSED	(1),(2),(3),(4),(5)	1.5		10	2/3 T.P.	
1006	ARGON, COMPRESSED	(1),(2),(3),(4),(5)	1.5		10	2/3 T.P.	
1046	HELIUM, COMPRESSED	(1),(2),(3),(4),(5)	1.5		10	2/3 T.P.	
1056	KRYPTON, COMPRESSED	(1),(2),(3),(4),(5)	1.5		10	2/3 T.P.	
1065	NEON, COMPRESSED	(1),(2),(3),(4),(5)	1.5		10	2/3 T.P.	
1066	NITROGEN, COMPRESSED	(1),(2),(3),(4),(5)	1.5		10	2/3 T.P.	
1979	RARE GASES MIXTURE, COMPRESSED	(1),(2),(3),(4),(5)	1.5		10	2/3 T.P.	
1980	RARE GASES AND OXYGEN MIXTURE, COMPRESSED	(1),(2),(3),(4),(5)	1.5		10	2/3 T.P.	
1981	RARE GASES AND NITROGEN MIXTURE, COMPRESSED	(1),(2),(3),(4),(5)	1.5		10	2/3 T.P.	
1982	TETRAFLUOROMETHANE, COMPRESSED (REFRIGERANT GAS R 14, COMPRESSED)	(1),(2),(3),(4),(5)		20	10	0.62	g
		(1),(2),(3),(4),(5)		30		0.94	g
2036	XENON, COMPRESSED	(1),(2),(3),(4),(5)		13	10	1.24	g
2193	HEXAFLUOROETHANE, COMPRESSED (REFRIGERANT GAS R 116, COMPRESSED)	(1),(2),(3),(4),(5)		20	10	1.10	g
1956	COMPRESSED GAS, N.O.S.	(1),(2),(3),(4),(5)	1.5		10	2/3 T.P.	z
1014	CARBON DIOXIDE AND OXYGEN MIXTURE, COMPRESSED	(1),(2),(3),(4),(5)	1.5		10	2/3 T.P.	
1072	OXYGEN, COMPRESSED	(1),(2),(3),(4),(5)	1.5		10	2/3 T.P.	
2451	NITROGEN TRIFLUORIDE	(1),(2),(3),(4),(5)		20	10	0.5	g
		(1),(2),(3),(4),(5)		30		0.75	g
3156	COMPRESSED GAS, OXIDIZING, N.O.S.	(1),(2),(3),(4),(5)	1.5		10	2/3 T.P.	z
1049	HYDROGEN, COMPRESSED	(1),(2),(3),(4),(5)	1.5		10	2/3 T.P.	
1957	DEUTERIUM, COMPRESSED	(1),(2),(3),(4),(5)	1.5		10	2/3 T.P.	
1962	ETHYLENE, COMPRESSED	(1),(2),(3),(4),(5)		22.5	10	0.34	g
		(1),(2),(3),(4),(5)		30.0	10	0.37	g
1971 1971	METHANE, COMPRESSED or NATURAL GAS, COMPRESSED with high methane content	(1),(2),(3),(4),(5)	1.5		10	2/3 T.P.	
2034	HYDROGEN AND METHANE MIXTURE, COMPRESSED	(1),(2),(3),(4),(5)	1.5		10	2/3 T.P.	

Identification No	Name of the substance or article	Receptacles	TEST			FILLING	Special Requirements
			PRESSURE		PERIOD (years) */	MAX. FILL. ratio kg/l or MPa or Vol %	
			X working pressure	MPa			
2203	SILANE, COMPRESSED **/	(1),(2),(3),(4),(5)		22.5	10	0.32	e,g,l
		(1),(2),(3),(4),(5)		25.0	10	0.41	e,g,l
1964	HYDROCARBON GAS MIXTURE, COMPRESSED,N.O.S	(1),(2),(3),(4),(5)	1.5		10	2/3 T.P.	z
1954	COMPRESSED GAS, FLAMMABLE, N.O.S	(1),(2),(3),(4),(5)	1.5		10	2/3 T.P.	z
1612	HEXAETHYL TETRAPHOSPHATE AND COMPRESSED GAS MIXTURE	(1),(2),(3),(4),(5)	1.5		5	2/3 T.P.	z
1955	COMPRESSED GAS, TOXIC, N.O.S.	(1),(2),(3),(4),(5)	1.5		5	2/3 T.P.	z
1016	CARBON MONOXIDE, COMPRESSED	(1),(2),(3),(4),(5)	1.5		5	2/3 T.P.	k
1023	COAL GAS, COMPRESSED	(1),(2),(3),(4),(5)	1.5		5	2/3 T.P.	
1071	OIL GAS, COMPRESSED	(1),(2),(3),(4),(5)	1.5		5	2/3 T.P.	
1911	DIBORANE, COMPRESSED	(1),(5)		25.0	5	0.072	e,f,l
2600	CARBON MONOXIDE AND HYDROGEN MIXTURE, COMPRESSED	(1),(2),(3),(4),(5)	1.5		5	2/3 T.P.	k
1953	COMPRESSED GAS, TOXIC, FLAMMABLE, N.O.S.	(1),(2),(3),(4),(5)	1.5		5	2/3 T.P.	z
1008	BORON TRIFLUORIDE, COMPRESSED	(1),(2),(3),(4),(5)		22.5	3	0.715	g
		(1),(2),(3),(4),(5)		30.0		0.86	g
1859	SILICON TETRAFLUORIDE, COMPRESSED	(1),(2),(3),(4),(5)		20	3	0.74	g
		(1),(2),(3),(4),(5)		30		1.1	g
2198	PHOSPHORUS PENTAFLUORIDE, COMPRESSED	(1),(5)		20	3	0.9	e,g,l
		(1),(5)		30		1.34	e,g,l
2417	CARBONYL FLUORIDE, COMPRESSED	(1),(2),(3),(4),(5)		20	3	0.47	g
		(1),(2),(3),(4),(5)		30		0.7	g
3304	COMPRESSED GAS, TOXIC, CORROSIVE, N.O.S.	(1),(2),(3),(4),(5)	1.5		3	2/3 T.P.	z
3303	COMPRESSED GAS, TOXIC, OXIDIZING, N.O.S.	(1),(2),(3),(4),(5)	1.5		5	2/3 T.P.	z
3305	COMPRESSED GAS, TOXIC, FLAMMABLE, CORROSIVE, N.O.S.	(1),(2),(3),(4),(5)	1.5		3	2/3 T.P.	z
1045	FLUORINE, COMPRESSED	(1),(5)		20 0	5	2.8 MPa	a,d,e,l
1660	NITRIC OXIDE, COMPRESSED	(1),(5)	1.5		3	2/3 T.P.	e,l

Identification No	Name of the substance or article	Receptacles	TEST			FILLING	Special Requirements
			PRESSURE		PERIOD (years) */	MAX. FILL. ratio kg/l or MPa or Vol %	
			X working pressure	MPa			
2190	OXYGEN DIFLUORIDE	(1),(5)		20.0	3	2.8 MPa	a,d,e,l
3306	COMPRESSED GAS, TOXIC, OXIDIZING, CORROSIVE, N.O.S.	(1),(2),(3),(4),(5)	1.5		3	2/3 T.P.	z
1009	BROMOTRIFLUOROMETHANE (REFRIGERANT GAS R 13B1)	(1),(2),(3),(4),(5)		4.2	10	1.13	g
		(1),(2),(3),(4),(5)		12.0	10	1.44	g
		(1),(2),(3),(4),(5)		25.0	10	1.60	g
1013	CARBON DIOXIDE	(1),(2),(3),(4),(5)		19.0	10	0.66	g
		(1),(2),(3),(4),(5)		25.0	10	0.75	g
1015	CARBON DIOXIDE AND NITROUS OXIDE MIXTURE	(1),(3),(5)		25.0	10	0.75	g
1018	CHLORODIFLUOROMETHANE (REFRIGERANT GAS R 22)	(1),(2),(3),(4),(5)		2.9	10	1.03	
1020	CHLOROPENTAFLUOROETHANE (REFRIGERANT GAS R 115)	(1),(2),(3),(4),(5)		2.5	10	1.08	
1021	1-CHLORO-1,2,2,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 124)	(1),(2),(3),(4),(5)		1.2	10	1.2	
1022	CHLOROTRIFLUOROMETHANE (REFRIGERANT GAS R 13)	(1),(2),(3),(4),(5)		10.0	10	0.83	g
		(1),(2),(3),(4),(5)		12.0	10	0.90	g
		(1),(2),(3),(4),(5)		19.0	10	1.04	g
		(1),(2),(3),(4),(5)		25.0	10	1.10	g
1028	DICHLORODIFLUOROMETHANE (REFRIGERANT GAS R 12)	(1),(2),(3),(4),(5)		1.8	10	1.15	
1029	DICHLOROFLUOROMETHANE (REFRIGERANT GAS R 21)	(1),(2),(3),(4),(5)		1.0	10	1.23	
1058	LIQUEFIED GASES, non-flammable, charged with nitrogen, carbon dioxide or air	(1),(2),(3),(4),(5)	1.5		10		j
1080	SULPHUR HEXAFLUORIDE	(1),(2),(3),(4),(5)		7.0	10	1.04	g
		(1),(2),(3),(4),(5)		14.0	10	1.33	g
		(1),(2),(3),(4),(5)		16.0	10	1.37	g
1858	HEXAFLUOROPROPYLENE (REFRIGERANT GAS R 1216)	(1),(2),(3),(4),(5)		2.2	10	1.11	
1952	CARBON DIOXIDE AND ETHYLENE OXIDE MIXTURE	(1),(2),(3),(4),(5)		19	10	0.66	
	with not more than 9% ethylene oxide	(1),(2),(3),(4),(5)		25	10	0.75	
1958	DICHLOROTETRAFLUOROETHANE (REFRIGERANT GAS R 114)	(1),(2),(3),(4),(5)		1.0	10	1.30	

Identification No	Name of the substance or article	Receptacles	TEST			FILLING	Special Requirements
			PRESSURE		PERIOD (years) */	MAX. FILL. ratio kg/l or MPa or Vol %	
			X working pressure	MPa			
1973	CHLORODIFLUOROMETHANE AND CHLOROPENTAFLUOROETHANE MIXTURE with fixed boiling point, with approximately 49% chlorodifluoromethane (REFRIGERANT GAS R 502)	(1),(2),(3),(4),(5)		3.1	10	1.05	
1974	CHLORODIFLUOROBROMO-METHANE (REFRIGERANT GAS R 12B1)	(1),(2),(3),(4),(5)		1.0	10	1.61	
1976	OCTAFLUOROCYCLOBUTANE (REFRIGERANT GAS RC 318)	(1),(2),(3),(4),(5)		1.1	10	1.34	
1983	1-CHLORO-2,2,2-TRIFLUOROETHANE (REFRIGERANT GAS R 133a)	(1),(2),(3),(4),(5)		1.0	10	1.18	
1984	TRIFLUOROMETHANE (REFRIGERANT GAS R 23)	(1),(2),(3),(4),(5) (1),(2),(3),(4),(5)		19.0 25.0	10 10	0.87 0.95	g g
2422	OCTAFLUOROBUT-2-ENE (REFRIGERANT GAS R 1318)	(1),(2),(3),(4),(5)		1.2	10	1.34	
2424	OCTAFLUOROPROPANE (REFRIGERANT GAS R 218)	(1),(2),(3),(4),(5)		2.5	10	1.09	
2599	CHLOROTRIFLUOROMETHANE AND TRIFLUOROMETHANE, AZEOTROPIC MIXTURE with approximately 60% chlorotrifluoromethane (REFRIGERANT GAS R 503)	(1),(2),(3),(4),(5)		4.2 10.0 10.0	10 10 10	0.20 0.66 0.66	
2602	DICHLORODIFLUOROMETHANEAND 1,1-DIFLUOROETHANE , AZEOTROPIC MIXTURE with approximately 74% dichlorodifluoromethane (REFRIGERANT GAS R 500)	(1),(2),(3),(4),(5)		2.2	10	1.01	
3070	ETHYLENE OXIDE AND DICHLORODIFLUOROMETHANE MIXTURE with not more than 12,5% ethylene oxyde	(1),(2),(3),(4),(5)		1.8	10	1.09	
3159	1,1,1,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 134a)	(1),(2),(3),(4),(5)		2.2	10	1.04	
3220	PENTAFLUOROETHANE (REFRIGERANT GAS R 125)	(1),(2),(3),(4),(5)		3.4 3.6	10 10	0.95 0.72	g g
3296	HEPTAFLUOROPROPANE (REFRIGERANT GAS R 227)	(1),(2),(3),(4),(5)		1.5	10	1.2	
3297	ETHYLENE OXIDE AND CHLOROTETRAFLUOROETHANE MIXTURE, with not more than 8,8% ethylene oxide	(1),(2),(3),(4),(5)		1.0	10	1.16	

Identification No	Name of the substance or article	Receptacles	TEST			FILLING	Special Requirements
			PRESSURE		PERIOD (years) */	MAX. FILL. ratio kg/l or MPa or Vol %	
			X working pressure	MPa			
3298	ETHYLENE OXIDE AND PENTAFLUOROETHANE MIXTURE, with not more than 7.9% ethylene oxide	(1),(2),(3),(4),(5)		2.6	10	1.02	
3299	ETHYLENE OXIDE AND TETRAFLUOROETHANE MIXTURE, with not more than 5.6% ethylene oxide	(1),(2),(3),(4),(5)		1.7	10	1.03	
3337	REFRIGERANT GAS R 404A	(1),(2),(3),(4),(5)		3.6	10	0.82	
3338	REFRIGERANT GAS R 407A	(1),(2),(3),(4),(5)		3.6	10	0.94	
3339	REFRIGERANT GAS R 407B	(1),(2),(3),(4),(5)		3.8	10	0.93	
3340	REFRIGERANT GAS R 407C	(1),(2),(3),(4),(5)		3.5	10	0.95	
1078	REFRIGERANT GASES, N.O.S.	(1),(2),(3),(4),(5)			10		z
	MIXTURE F1	(1),(2),(3),(4),(5)		1.2	10	1.23	
	MIXTURE F2	(1),(2),(3),(4),(5)		1.8	10	1.15	
	MIXTURE F3	(1),(2),(3),(4),(5)		2.9	10	1.03	
1968	INSECTICIDE GAS, N.O.S.	(1),(2),(3),(4),(5)			10		z
3163	LIQUEFIED GAS, N.O.S.	(1),(2),(3),(4),(5)			10		z
1070	NITROUS OXIDE	(1),(2),(3),(4),(5)		18.0	10	0.68	g
		(1),(2),(3),(4),(5)		22.5	10	0.74	g
		(1),(2),(3),(4),(5)		25.0	10	0.75	g
3157	LIQUEFIED GAS, OXIDIZING, N.O.S.	(1),(2),(3),(4),(5)			10		z
1010	1,2-BUTADIENE, INHIBITED or	(1),(2),(3),(4),(5)		1.0	10	0.59	f
1010	1,3-BUTADIENE, INHIBITED or	(1),(2),(3),(4),(5)		1.0	10	0.55	f
1010	MIXTURES OF 1,3-BUTADIENE AND HYDROCARBONS, INHIBITED	(1),(2),(3),(4),(5)			10	0.5	f,j
1011	BUTANE	(1),(2),(3),(4),(5)		1.0	10	0.51	
1012	BUTYLENES MIXTURE or	(1),(2),(3),(4),(5)			10	0.5	j
1012	1-BUTYLENE or	(1),(2),(3),(4),(5)		1.0	10	0.53	
1012	CIS-2-BUTENE or	(1),(2),(3),(4),(5)		1.0	10	0.55	
1012	TRANS-2-BUTYLENE	(1),(2),(3),(4),(5)		1.0	10	0.54	
1027	CYCLOPROPANE	(1),(2),(3),(4),(5)		2.0	10	0.53	
1030	1,1-DIFLUOROETHANE (REFRIGERANT GAS R 152a)	(1),(2),(3),(4),(5)		1.8	10	0.79	
1032	DIMETHYLAMINE, ANHYDROUS	(1),(2),(3),(4),(5)		1.0	10	0.59	b
1033	DIMETHYL ETHER	(1),(2),(3),(4),(5)		1.8	10	0.58	

Identification No	Name of the substance or article	Receptacles	TEST			FILLING	Special Requirements
			PRESSURE		PERIOD (years) */	MAX. FILL. ratio kg/l or MPa or Vol %	
			X working pressure	MPa			
1035	ETHANE	(1),(2),(3),(4),(5)		9.5	10	0.25	g
		(1),(2),(3),(4),(5)		12	10	0.29	g
		(1),(2),(3),(4),(5)		30.0	10	0.39	g
1036	ETHYLAMINE	(1),(2),(3),(4),(5)		1.0	10	0.61	b
1037	ETHYL CHLORIDE	(1),(2),(3),(4),(5)		1.0	10	0.80	a
1039	ETHYL METHYL ETHER	(1),(2),(3),(4),(5)		1	10	0.64	
1041	ETHYLENE OXIDE AND CARBON DIOXIDE MIXTURE, with more than 9% ethylene oxide but not more than 87%	(1),(2),(3),(4),(5)		19 25	10 10	0.66 0.75	g g
1055	ISOBUTYLENE	(1),(2),(3),(4),(5)		1.0	10	0.52	
1060	METHYLACETYLENE AND PROPADIENE MIXTURE, STABILIZED	(1),(2),(3),(4),(5)			10		c,f,j
	Propadiene with 1% to 4% methylacetylene	(1),(2),(3),(4),(5)		2.2	10	0.50	c,f
	MIXTURE P1	(1),(2),(3),(4),(5)		3.0	10	0.49	c,f
	MIXTURE P2	(1),(2),(3),(4),(5)		2.4	10	0.47	c,f
1061	METHYLAMINE, ANHYDROUS	(1),(2),(3),(4),(5)		1.3	10	0.58	b
1063	METHYL CHLORIDE (REFRIGERANT GAS R 40)	(1),(2),(3),(4),(5)		1.7	10	0.81	a
1077	PROPYLENE	(1),(2),(3),(4),(5)		3.0	10	0.43	
1081	TETRAFLUOROETHYLENE, INHIBITED	(1),(2),(3),(4),(5)		20.0	10	0.5 MPa	f
1083	TRIMETHYLAMINE, ANHYDROUS	(1),(2),(3),(4),(5)		1.0	10	0.56	b
1085	VINYL BROMIDE, INHIBITED	(1),(2),(3),(4),(5)		1.0	10	1.37	a,f
1086	VINYL CHLORIDE, INHIBITED	(1),(2),(3),(4),(5)		1.2	10	0.81	a,f
1087	VINYL METHYL ETHER, INHIBITED	(1),(2),(3),(4),(5)		1.0	10	0.67	f
1860	VINYL FLUORIDE, INHIBITED	(1),(2),(3),(4),(5)		25.0	10	0.64	a,f,g
1912	METHYLCHLORIDE AND METHYLENE CHLORIDE MIXTURE	(1),(2),(3),(4),(5)		1.7	10	0.81	a
1959	1,1-DIFLUOROETHYLENE (REFRIGERANT GAS R 1132a)	(1),(2),(3),(4),(5)		25	10	0.77	g
1969	ISOBUTANE	(1),(2),(3),(4),(5)		1.0	10	0.49	
1978	PROPANE	(1),(2),(3),(4),(5)		2.5	10	0.42	
2035	1,1,1-TRIFLUOROETHANE (REFRIGERANT GAS R 143a)	(1),(2),(3),(4),(5)		3.5	10	0.75	

Identification No	Name of the substance or article	Receptacles	TEST			FILLING	Special Requirements
			PRESSURE		PERIOD (years) */	MAX. FILL. ratio kg/l or MPa or Vol %	
			X working pressure	MPa			
2044	2,2-DIMETHYLPROPANE	(1),(2),(3),(4),(5)		1.0	10	0.53	
2200	PROPADIENE, INHIBITED	(1),(2),(3),(4),(5)		2.2	10	0.50	f
2419	BROMOTRIFLUOROETHYLENE	(1),(2),(3),(4),(5)		1.0	10	1.19	
2452	ETHYLACETYLENE, INHIBITED	(1),(2),(3),(4),(5)		1.0	10	0.57	c,f
2453	ETHYL FLUORIDE (REFRIGERANT GAS R 161)	(1),(2),(3),(4),(5)		3.0	10	0.57	
2454	METHYL FLUORIDE (REFRIGERANT GAS R 41)	(1),(2),(3),(4),(5)		30.0	10	0.36	
2517	1-CHLORO-1,1-DIFLUOROETHANE (REFRIGERANT GAS R 142b)	(1),(2),(3),(4),(5)		1.0	10	0.99	
2601	CYCLOBUTANE	(1),(2),(3),(4),(5)		1.0	10	0.63	
3153	PERFLUORO(METHYL VINYL ETHER)	(1),(2),(3),(4),(5)		2.0	10	0.75	
3154	PERFLUORO(ETHYL VINYL ETHER)	(1),(2),(3),(4),(5)		1.0	10	0.98	
3252	DIFLUOROMETHANE (REFRIGERANT GAS R 32)	(1),(2),(3),(4),(5)		4.8	10	0.78	
1965	HYDROCARBON GAS MIXTURE, LIQUEFIED N.O.S.	(1),(2),(3),(4),(5)			10	**/	m, z
	MIXTURE A	(1),(2),(3),(4),(5)		1.0	10	0.50	
	MIXTURE A01	(1),(2),(3),(4),(5)		1.5	10	0.49	
	MIXTURE A02	(1),(2),(3),(4),(5)		1.5	10	0.48	
	MIXTURE A0	(1),(2),(3),(4),(5)		1.5	10	0.47	
	MIXTURE A1	(1),(2),(3),(4),(5)		2.0	10	0.46	
	MIXTURE B1	(1),(2),(3),(4),(5)		2.5	10	0.45	
	MIXTURE B2	(1),(2),(3),(4),(5)		2.5	10	0.44	
	MIXTURE B	(1),(2),(3),(4),(5)		2.5	10	0.43	
	MIXTURE C	(1),(2),(3),(4),(5)		3.0	10	0.42	
3354	INSECTICIDE GAS, FLAMMABLE, N.O.S.	(1),(2),(3),(4),(5)			10		z
3161	LIQUEFIED GAS, FLAMMABLE, N.O.S.	(1),(2),(3),(4),(5)			10		z
1062	METHYL BROMIDE	(1),(2),(3),(4),(5)		1.0	5	1.51	a
1581	CHLOROPICRIN AND METHYL BROMIDE MIXTURE	(1),(2),(3),(4),(5)		1.0	5	1.51	a
1582	CHLOROPICRIN AND METHYL CHLORIDE MIXTURE	(1),(2),(3),(4),(5)		1.7	5	0.81	a
2191	SULPHURYL FLUORIDE	(1),(2),(3),(4),(5)		5.0	5	1.10	k
1967	INSECTICIDE GAS, TOXIC, N.O.S.	(1),(2),(3),(4),(5)			5		z

Identification No	Name of the substance or article	Receptacles	TEST			FILLING	Special Requirements
			PRESSURE		PERIOD (years) */	MAX. FILL. ratio kg/l or MPa or Vol %	
			X working pressure	MPa			
3162	LIQUEFIED GAS, TOXIC, N.O.S.	(1),(2),(3),(4),(5)			5		z
1026	CYANOGEN	(1),(2),(3),(4),(5)		10.0	5	0.70	k
1040	ETHYLENE OXIDE, or ETHYLENE OXIDE WITH NITROGEN up to a total pressure of 1MPa (10 bar) at 50 °C	(1),(2),(3),(4),(5)		1.5	5	0.78	f
1053	HYDROGEN SULPHIDE	(1),(2),(3),(4),(5)		5.5	5	0.67	k
1064	METHYL MERCAPTAN	(1),(2),(3),(4),(5)		1.0	5	0.78	k
1082	TRIFLUOROCHLOROETHYLENE, INHIBITED	(1),(2),(3),(4),(5)		1.9	5	1.13	f,k
2188	ARSINE	(1),(5)		4.2	5	1.10	e,l
2192	GERMANE ***/	(1),(5)		25.0	5	1.02	e,g,l
2199	PHOSPHINE ***/	(1),(5)		25.0	5	0.51	e,g,l
		(1),(5)		25.0	5	0.51	e,g,l
2202	HYDROGEN SELENIDE, ANHYDROUS	(1),(5)		3.1	5	1.60	e,l
2204	CARBONYL SULPHIDE	(1),(2),(3),(4),(5)		2.6	5	0.84	k
2676	STIBINE	(1),(5)		2.0	5	1.2	e,l
3300	ETHYLENE OXIDE AND CARBON DIOXIDE MIXTURE with more than 87% ethylene oxide	(1),(2),(3),(4),(5)		2.8	5	0.73	f
3355	INSECTICIDE GAS, TOXIC, FLAMMABLE N.O.S.	(1),(2),(3),(4),(5)			5		z
3160	LIQUEFIED GAS, TOXIC, FLAMMABLE N.O.S.	(1),(2),(3),(4),(5)			5		z
1005	AMMONIA, ANHYDROUS	(1),(2),(3),(4),(5)		3.3	5	0.53	b
1017	CHLORINE	(1),(2),(3),(4),(5)		2.2	5	1.25	a
1048	HYDROGEN BROMIDE, ANHYDROUS	(1),(2),(3),(4),(5)		6.0	3	1.54	a
1050	HYDROGEN CHLORIDE, ANHYDROUS	(1),(2),(3),(4),(5)		10.0	3	0.30	a,g
		(1),(2),(3),(4),(5)		12.0	3	0.56	a,g
		(1),(2),(3),(4),(5)		15.0	3	0.67	a,g
		(1),(2),(3),(4),(5)		20.0	3	0.74	a,g
1069	NITROSYL CHLORIDE	(1),(5)		1.3	3	1.10	e,l
1076	PHOSGENE	(1),(3),(5)		2.0	3	1.23	e,l
1079	SULPHUR DIOXIDE	(1),(2),(3),(4),(5)		1.4	3	1.23	
1589	CYANOGEN CHLORIDE, INHIBITED	(1),(5)		2.0	3	1.03	e,f,l
1741	BORON TRICHLORIDE	(1),(2),(3),(4),(5)		1.0	3	1.19	
2194	SELENIUM HEXAFLUORIDE	(1),(5)		3.6	3	1.46	e,g,l
2195	TELLURIUM HEXAFLUORIDE	(1),(5)		2.0	3	1.0	e,l
2196	TUNGSTEN HEXAFLUORIDE	(1),(5)		1.0	3	2.70	a,e,l
2197	HYDROGEN IODIDE, ANHYDROUS	(1),(2),(3),(4),(5)		2.3	3	2.25	a
2418	SULPHUR TETRAFLUORIDE	(1),(5)		3	3	0.91	e,l
2420	HEXAFLUOROACETONE	(1),(2),(3),(4),(5)		2.2	3	1.08	

Identification No	Name of the substance or article	Receptacles	TEST			FILLING	Special Requirements
			PRESSURE		PERIOD (years) */	MAX. FILL. ratio kg/l or MPa or Vol %	
			X working pressure	MPa			
3057	TRIFLUOROACETYL CHLORIDE	(1),(2),(3),(4),(5)		1.7	3	1.17	
3308	LIQUEFIED GAS, TOXIC, CORROSIVE N.O.S.	(1),(2),(3),(4),(5)			3		z
3083	PERCHLORYL FLUORIDE	(1),(2),(3),(4),(5)		3.3	5	1.21	e,k,l
3307	LIQUEFIED GAS, TOXIC, OXIDIZING N.O.S.	(1),(2),(3),(4),(5)			5		z
2189	DICHLOROSILANE	(1),(2),(3),(4),(5)		1	3	0.90	
2534	METHYLCHLOROSILANE	(1),(2),(3),(4),(5)			3		l
3309	LIQUEFIED GAS, TOXIC, FLAMMABLE, CORROSIVE N.O.S.	(1),(2),(3),(4),(5)			3		z
1067	DINITROGEN TETROXIDE (NITROGEN DIOXIDE)	(1),(3),(5)		1.0	3	1.30	e,l
1749	CHLORINE TRIFLUORIDE	(1),(2),(3),(4),(5)		3.0	3	1.40	a
1975	NITRIC OXIDE AND DINITROGEN TETROXIDE MIXTURE (NITRIC OXIDE AND NITROGEN DIOXIDE MIXTURE)	(1),(3),(5)			3		e,j,l
2548	CHLORINE PENTAFLUORIDE	(1),(5)		1.3	3	1.49	a,e,l
2901	BROMINE CHLORIDE	(1),(2),(3),(4),(5)		1.0	3	1.5	a
3310	LIQUEFIED GAS, TOXIC, OXIDIZING, CORROSIVE N.O.S.	(1),(2),(3),(4),(5)			3		z
2073	AMMONIA SOLUTION, relative density less than 0.88 at 15 °C						
	with more than 35% and not more than 40% ammonia	(1),(2),(3),(4),(5)		1.0	5	0.80	
	with more than 40% and not more than 50% ammonia	(1),(2),(3),(4),(5)		1.2	5	0.77	
1001	ACETYLENE , DISSOLVED	(1),(5)		6.0	10		c,h,i
3318	AMMONIA SOLUTION, relative density less than 0.880 at 15 °C in water, with more than 50% ammonia	(1),(2),(3),(5)			5		j

P 201	Packing Instruction	P201

Type of packages

Gas samples of class 2

The general packing requirements of 4.1.4.1 when applicable shall be met.

201(a) Gas samples shall be at a pressure corresponding to ambient atmospheric pressure at the time the containment system is closed and this shall not exceed 105 kPa absolute.

201(b) The gases shall be contained in hermetically sealed glass or metal inner packagings with a maximum net quantity per package of 5 litres for flammable gases and 1 litre for toxic gases.

201(c) The outer packagings shall meet the packing group III performance level.

P 202	Packing Instruction	P202

Type of packages

Air bag inflators, modules and seat pretensioners

see text as proposed in ST/SG/AC.10/C.3/1998/19)

P 203	Packing Instruction	P203

Type of receptacles

Cryogenic receptacles, closed

The general packing requirements of 4.1.4.1 shall be met.

Particular instructions for closed cryogenic receptacles:

203(a) For non-flammable, non- toxic refrigerated liquefied gases the degree of filling, at the filling temperature and at a pressure of 0.1 MPa (1 bar) shall not exceed 98% of the capacity.

203(b) For flammable refrigerated liquefied gases the degree of filling shall remain below the level at which, if the contents were raised to the temperature at which the vapour pressure equalled the opening pressure of the relief valve, the volume would reach 95% of the capacity at that temperature.

203(c) In the case of receptacles intended for the carriage of oxidising gases , the substances used to ensure the leakproofness of the joints or for the maintenance of the closures shall be compatible with the contents.

203(d) Receptacles shall be subjected to periodic inspections in accordance with the provisions of 6.2.1.5.

203(e) Periodic inspections shall be carried out every 10 years.

By derogation from this paragraph, the periodic inspection of receptacles which make use of composite materials (composite receptacles) shall be carried out at intervals determined by the competent authority which has approved the technical code for the design and construction.

Particular instructions for open cryogenic receptacles:

203(f) The receptacles shall be so insulated that they cannot become coated with dew or hoar-frost.

203(g) Open cryogenic receptacles are not allowed for refrigerated liquefied gases of 3 °F, carbon dioxide, refrigerated liquid (2187) and its mixtures.

203(h) The receptacles shall be equipped with devices which prevent the liquid from splashing out.

203(i) Glass receptacles shall be protected by iron-wire baskets and placed in metal cases. The metal cases for the glass receptacles and the other receptacles shall be fitted with means of handling. Receptacles in glass are not allowed for [...] [?]

203(j) The openings of the receptacles shall be fitted with devices allowing gases to escape, preventing any splashing out of the liquid, and so fixed that they cannot fall out.

203(k) In the case of refrigerated liquid oxygen (1073) of 3O and mixtures thereof, the devices referred to above and the absorbent insulating material surrounding the glass receptacles shall be made of incombustible materials.]

Proposal 4

6.2 Requirements for the construction and testing of pressure receptacles for gases including pressure receptacles which are elements of MEGCs.

6.2.1 General requirements

[6.2.1.1 Design and construction

6.2.1.1.1 Pressure receptacles and their closures shall be designed, manufactured, tested and equipped in such a way as to withstand all conditions to which they will be subjected during their normal use and during normal transport conditions.

6.2.1.1.2 For metallic cylinders, tubes, pressure drums, bundles of cylinders, the construction shall be such that a minimum burst ratio (burst pressure divided by test pressure) is

1.60 for refillable pressure receptacles
2.00 for non-refillable pressure receptacles

6.2.1.1.3 Pressure receptacles and their closures shall be made of suitable materials which shall be resistant to brittle fracture and to stress corrosion cracking between -20 °C and +50 °C.

6.2.1.1.4 For welded pressure receptacles only materials of faultless weldability whose adequate impact strength at an ambient temperature of -20 °C can be guaranteed, particularly in the weld seams and the zones adjacent thereto, shall be used. Welds shall be skilfully made and shall afford the fullest safety. Any additional thickness to allow for corrosion shall not be taken into consideration in calculating the thickness of the walls.

6.2.1.1.5 Pressure receptacles for acetylene, dissolved, UN 1001 shall be filled entirely with a porous material, uniformly distributed, of a type approved by the competent authority and which:

(a) does not attack the pressure receptacles or form harmful or dangerous compounds either with the acetylene or with the solvent;

(b) is capable of preventing the spread of decomposition of the acetylene in the mass

The solvent shall not attack the pressure receptacles.

6.2.1.1.6 For composite cylinders, tubes, pressure drums and bundles of cylinders which make use of composite materials i.e. comprising a liner hoop wrapped or fully wrapped with reinforcement material, the construction shall be such that a minimum burst ratio (burst pressure divided by test pressure) is

1.67 for hoop wrapped pressure receptacles
2.00 for fully wrapped pressure receptacles

6.2.1.1.7 The following requirements apply to the construction of closed cryogenic pressure receptacles for refrigerated liquefied gases:

- All the mechanical and technological characteristics of the metal used shall be established for each pressure receptacle at the initial inspection, with regard to the impact strength and the bending coefficient.

- The pressure receptacles shall be thermally insulated. The thermal insulation shall be protected against impact by means of continuous sheathing. If the space between the pressure receptacle and the sheathing is airless (vacuum-insulation), the protective sheathing shall be designed to withstand without deformation an external pressure of at least 100 kPa (1 bar). If the sheathing is so closed as to be gas-tight (e.g. in the case of vacuum-insulation), a device shall be provided to prevent any dangerous pressure from developing in the insulating layer in the event of inadequate gas-tightness of the pressure receptacle or its fittings. The device shall prevent moisture from penetrating into the insulation.

6.2.1.1.8 The test pressure of receptacles is provided in P200 for cylinders, tubes, pressure drums and bundle of cylinders. The test pressure for cryogenic receptacles, closed, is not less than 1.3 times the maximum allowable working pressure (MAWP) increased by 1 bar for vacuum insulated receptacles.]

6.2.1.2 Materials of pressure receptacles

6.2.1.2.1 The materials of which the pressure receptacles and their closures are made and all substances that might come into contact shall be compatible with the contents and shall not form harmful or dangerous compounds therewith. Additionally, they shall resist brittle fracture at the lowest working temperature of the receptacle and its fittings.

6.2.1.3 Service equipment

6.2.1.3.1 Valves, piping and fittings equipment shall have at least the same test pressure as the receptacles.

6.2.1.3.2 Service equipment shall be so arranged as to be protected against the risk of being wrenched off or damaged during handling and transport. Manifold piping leading to shut-off valves shall be sufficiently flexible to protect the valves and the piping from shearing. The filling and discharge and any protective caps shall be capable of being secured against unintended opening. Valves shall be protected as specified in section 4.1.4.1.4.

6.2.1.3.3 Pressure receptacles which are not capable of being carried manually or rolled, shall be fitted with devices (skids, rings, straps,) ensuring that they can be safely handled by mechanical means and so arranged as not to impair the strength of, nor cause undue stresses in, the wall of the receptacle.

[6.2.1.3.4 Cryogenic receptacles, closed, shall be fitted with one or more pressure-relief devices to protect the vessel against excess pressure. Excess pressure means a pressure in excess of 110% of the MAWP due to normal heat leak or in excess of the test pressure due to the loss of vacuum for vacuum insulated receptacles or due to the failure in the open position of a pressure build up system. The valves shall be so constructed as to work perfectly even at their lowest working temperature. Their reliability of functioning at that temperature shall be established and checked by testing each valve or a sample of valves of the same type of construction. The vents and safety valves of receptacles shall be so designed as to prevent the liquid from splashing out.]

6.2.1.3.5 Receptacles whose filling is measured by volume shall be provided by a level indicator.

6.2.1.4 Initial inspection and tests

6.2.1.4.1 New pressure receptacles shall be subjected to testing and inspection after manufacture in accordance with the following:

On an adequate sample of pressure receptacles:

(a) Testing of the mechanical characteristics of the material of construction ;

(b) Verification of the minimum wall thickness;

(c) Checking the homogeneity of the material for each manufacturing batch, and inspection of the external and internal condition of the pressure receptacles;

For all pressure receptacles:

(d) A hydraulic pressure test. Pressure receptacles shall withstand the test pressure without undergoing permanent deformation or exhibiting cracks.

NOTE: *With the agreement of the testing and certifying body authorised by the competent authority, the hydraulic pressure test may be replaced by a test using a gas, where such an operation does not entail any danger.*

(e) An inspection of the markings on the pressure receptacles, see sub-section 6.2.1.6;

(f) In addition, pressure receptacles intended for the transport of acetylene, dissolved, UN 1001 shall have an inspection of the nature of the porous material and the quantity of solvent.

6.2.1.4.2 Aluminium alloy shall be checked for intercrystalline corrosion.

6.2.1.5 Periodic inspection

6.2.1.5.1 Refillable pressure receptacles, with the exception of open cryogenic receptacles, shall be subjected to periodic inspections under the supervision of a body authorised by the competent authority, in accordance with the following :

(a) Check of the external conditions of the pressure receptacle and verification of the equipment and the external markings;

(b) Check of the internal conditions of the pressure receptacle (e.g. by weighing, internal inspection, checks of wall thickness);

(c) The hydraulic pressure test and, if necessary, verification of the characteristics of the material by suitable tests;

***NOTE 1**: With the agreement of the testing and certifying body authorised by the competent authority, the hydraulic pressure test may be replaced by a test using a gas, where such an operation does not entail any danger*

***NOTE 2**: With the agreement of the testing and certifying body authorised by the competent authority, the hydraulic pressure test of cylinders and tubes may be replaced by an equivalent method based on acoustic emission or based on ultrasound.*

6.2.1.5.2 For pressure receptacles intended for the transport of acetylene, dissolved, UN 1001 only the external condition (corrosion, deformation), and the condition of the porous mass (loosening, settlement) shall be examined.

6.2.1.5.3 By derogation from paragraph 6.2.1.5.1(c) closed cryogenic pressure receptacles shall be subjected to external inspection and to a leakproofness test. The leakproofness test shall be carried out with the gas contained in the receptacle or with an inert gas. Checking shall be performed by means of a pressure gauge or by vacuum measurement. The thermal insulation need not be removed.

6.2.1.6 Marking of receptacles

6.2.1.6.1 Refillable pressure receptacles shall be marked clearly, legibly and permanently, as follows:

(a) The name or the mark of the manufacturer;

(b) The receptacles specification (the type specification or the standard used for the design);

(c) The serial number of the receptacle provided by the manufacturer;

(d) The mass of the receptacle;

(e) The test pressure;

(f) The date (month and year) of the initial inspection

(g) The identification mark of the authorised body who carried out the tests and inspections;

(h) In the case of acetylene, dissolved UN 1001: the permitted filling pressure (see section 4.1.4.5) and the total of the mass of: the empty receptacle, the fittings and accessories, the porous material and the solvent;

(i) The water capacity in litres;

(j) The working pressure in the case of compressed gases;

(k) The letter "H" showing compatibility with gases with a risk of hydrogen embritlement.

These marks shall be permanently affixed, (e.g. stamped, engraved, or etched) on the pressure receptacle. The markings shall be on the shoulder, top head or neck of the pressure receptacle or on a permanently affixed component of the pressure receptacle (e.g welded collar). Other markings are allowed provided they are made in low stress areas other than the side wall and are not of a size and depth that will create harmful stress concentrations. Such marks shall not conflict with required markings.

6.2.1.6.2 In addition to the markings specified in section 6.2.1.6.1, each refillable pressure receptacle shall be marked indicating the date (month and year) of the last periodic inspection and the registered mark of the test body authorized by the competent authority of the country of use.

6.2.1.6.3 Non-refillable pressure receptacles shall be marked clearly, legibly, and durably, as follows:

(a) The name or the mark of the manufacturer;

(b) The pressure receptacles specification (the type specification or the standard used for the design);

(c) The serial or batch number of the pressure receptacle provided by the manufacturer;

(d) The test pressure;

(e) The date (month and year) of manufacturing;

(f) The identification stamp of the authorised body who carried out the tests and inspections;

(g) The words "DO NOT REFILL"; this marking shall be a minimum of 6 mm in height.

These marks shall be permanently stencilled, stamped, engraved or etched on the pressure receptacle. Except when stencilled the markings shall be on the shoulder, top head or neck of the pressure receptacle or on a permanently affixed component of the pressure receptacle (e.g welded collar). Other markings are allowed provided they are made in low stress areas other than the side wall and are not of a size and depth that will create harmful stress concentrations. Such marks shall not conflict with required markings.

6.2.1.6.4 Pressure receptacles designed, manufactured and tested according the appropriate standards out of the reference list of 6.2.2 may in addition bear the UN mark. When affixed, the UN mark shall be followed by the country authorising the mark.

6.2.2 Pressure receptacles designed, constructed and tested according to standards

The following requirements of section 6.2.1 are considered to have been complied with if the following standards, as relevant are applied:

Reference	Title of document	Applicable sections
for materials		
EN ISO 11114-1:1997	Compatibility of cylinder and valve materials with gas contents- Part 1: Metallic materials	6.2.1.2
prEN ISO/DIS 11114-2	Compatibility of cylinder and valve materials with gas contents- Part 2: Non-metallic materials	6.2.1.2

Reference	Title of document	Applicable sections
for cylinders		
ISO/DIS 9809-1	Transportable seamless steel gas cylinders - Design, construction and testing - Part 1: Quenched and tempered steel cylinders with tensile strength less than 1100 MPa	
ISO/DIS 9809-2	Transportable seamless steel gas cylinders - Design, construction and testing - Part 2: Quenched and tempered steel cylinders with tensile strength greater than or equal to 1100 MPa	
ISO/DIS 9809-3	Transportable seamless steel gas cylinders - Design, construction and testing - Part 3: Normalized steel cylinders	
ISO/DIS 7866	Refillable transportable seamless aluminium alloy for world-wide usage - Design, manufacture and acceptance	
ISO/CD 11119-1	Gas cylinders of composite material - Specifications and test methods - Part 1: Hoop wrapped, metallic	
ISO/CD 11119-1	Gas cylinders of composite material - Specifications and test methods - Part 2: Fully wrapped, metallic	
ISO/CD 11119-1	Gas cylinders of composite material - Specifications and test methods - Part 3: Fully wrapped, non metallic	
ISO/DIS 3807-1	Dissolved acetylene cylinders - Basic requirements - Part 1 Cylinders without fusible plugs	
ISO/DIS 3807-2	Dissolved acetylene cylinders - Basic requirements - Part 2 Cylinders with fusible plugs	
ISO/DIS 11118	Non-refillable gas cylinders - Specifications and test methods	
for tubes		
prEN ISO/DIS 11120	Gas cylinders - Refillable seamless steel gas cylinders, capacity between 150l and 3000l - Design and testing	
for closures and their protection		
ISO/AWI 14245	Specification and testing for liquefied petroleum gas (LPG) valves self closing	
ISO/AWI 15995	Specifications and testing for manually operated liquefied petroleum gas valves	
ISO/FDIS 11117	Gas cylinders - Valve protection caps and valve guards for industrial and medical gas cylinders- design, construction and tests	6.2.1.1
ISO/DIS 10297.2	Gas cylinder valves - Specification and type testing. All gases except LPG	6.2.1.1.
for markings		
ISO/CD 13769	Gas cylinders - Stamp marking	6.2.1.6.1 or 6.2.1.6.2
for periodic inspection		
ISO 6406: 1992	Periodic inspection and testing of seamless steel gas cylinders	
ISO 10460:1993	Welded carbon steel gas cylinders - Periodic inspection and testing	
ISO 10461:1993	Seamless aluminium - alloy gas cylinders - Periodic inspection and testing	
ISO 10462:1993	Cylinders for dissolved acetylene - Periodic inspection and testing	
ISO 10464:1993	Liquefied petroleum gas cylinders - Periodic inspection and testing	
prEN ISO/DIS 11623	Composite gas cylinders - Periodic inspection and testing	

6.2.3 Requirements for pressure receptacles not designed, constructed and tested according to standards

Pressure receptacles not designed, constructed and tested according to standards listed in the table of 6.2.2 shall be designed, constructed and tested in accordance with the provisions of a technical code recognised by the competent authority and . The requirements of 6.2.1 however shall be met.

[6.2.4 Approval of pressure receptacles

6.2.4.1 The conformity of pressure receptacles, having a test pressure capacity product of more than 300 MPa.litre (3000 bar.litre) with the provisions of Class 2, shall be assessed by one of the following methods:

(a) Single pressure receptacles shall be examined, tested and approved by a testing and certifying body approved by the competent authority of the country of origin, on the basis of the technical documentation and declaration of the manufacturer on compliance with the relevant provisions of this Class.
The technical documentation shall include full specifications on design and construction, and full documentation on the manufacturing and testing; or

(b) The construction of the pressure receptacles shall be tested and approved by a testing and certifying body approved by the competent authority of the country of origin 6/ on the basis of the technical documentation with regard to their compliance with the relevant provisions of this Class.
Pressure receptacles shall furthermore be designed, manufactured and tested according to a comprehensive quality assurance programme for design, manufacture, final inspection and testing. The quality assurance programme shall guarantee the conformity of the pressure receptacles with the relevant provisions of this Class and shall be approved and supervised by a testing and certifying body approved by the competent authority of the country of origin; or

(c) The design type of the pressure receptacles shall be approved by a testing and certifying body approved by the competent authority of the country of origin. Any pressure receptacle of this design shall be manufactured and tested according to a quality assurance programme for production, final inspection and testing, which shall be approved and supervised by a testing and certifying body approved by the competent authority of the country of origin; or

(d) The design type of the pressure receptacles shall be approved by a testing and certifying body approved by the competent authority of the country of origin. Any pressure receptacle of this design shall be tested under the supervision of a testing and certifying body approved by the competent authority of the country of origin on the basis of a declaration of the manufacturer on compliance with the approved design and the relevant provisions of this Class.

6.2.4.2 The conformity of pressure receptacles having a test pressure capacity product of more than 100 MPa.litre (100 bar.litre) and not more than 300 MPa.litre (3000 bar.litre) with the provisions of Class 2 shall be assessed by one of the methods described in (1) or by one of the following methods:

(a) The pressure receptacles shall be designed, manufactured and tested according to a comprehensive quality assurance programme for their design, manufacture, final inspection and testing, approved and supervised by a testing and certifying body approved by the competent authority of the country of origin; or

(b) The design type of the pressure receptacle shall be approved by a testing and certifying body approved by the competent authority of the country of origin. The compliance of any pressure receptacle with the approved design shall be declared in writing by the manufacturer on the basis of his quality assurance programme for final inspection and testing of pressure receptacles, approved and supervised by a testing and certifying body approved by the competent authority of the country of origin; or

(c) The design type of the pressure receptacle shall be approved by a testing and certifying body approved by the competent authority of the country of origin. The compliance of any pressure receptacle with the approved design shall be declared in writing by the manufacturer and all pressure receptacles of this type shall be tested under the supervision of a testing and certifying body approved by the competent authority of the country of origin.

6.2.4.3 The conformity of pressure receptacles, having a test pressure capacity product of not more than 100 MPa.litre (100 bar.litre) with the provisions of Class 2 shall be assessed by one of the methods described in 6.2.4.1 or 6.2.4.2 or by one of the following methods:

(a) The compliance of any pressure receptacle with a design, fully specified in technical documentation, shall be declared in writing by the manufacturer and pressure receptacles of this design shall be tested under the supervision of a testing and certifying body approved by the competent authority of the country of origin; or

(b) The design type of the pressure receptacles shall be approved by a testing and certifying body approved by the competent authority of the country of origin. The compliance of all pressure receptacles with the approved design shall be declared in writing by the manufacturer and all pressure receptacles of this type shall be tested individually.

6.2.4.4 The requirements of paragraphs 6.2.4.1 to 6.2.4.3 as regards the quality assurance systems shall be deemed to be complied with, if they conform to the relevant standard of the ISO 9000 series or to ISO/CD 14600 Transportable gas cylinders - International quality assurance system.

6.2.4.5 Requirements for manufacturers

The manufacturer shall be technically able and shall possess all suitable means required for the satisfactory manufacture of pressure receptacles; this relates in particular to qualified personnel

(a) to supervise the entire manufacturing process;

(b) to carry out joining of materials;

(c) to carry out the relevant tests.

The proficiency test of a manufacturer shall in all instances be carried out by a testing and certifying body approved by the competent authority of the country of origin. The particular certification process the manufacturer intends to apply shall be taken into consideration.

6.2.4.6 Requirements for testing and certifying bodies

Testing and certifying bodies shall be independent from manufacturing enterprises and technologically competent to the degree required.]

Proposal 5

Proposed text for Part 5

5.2.2.2.1.2 Gas cylinders for Class 2 may, on account of their shape, orientation and securing mechanisms for transport, bear labels representative of those specified in this section, which have been reduced in size **according to ISO 7225**, for display on the non-cylindrical part (shoulder) of such cylinders.

For cylinders with an outside diameter lower or equal to 75mm, the cylindrical part may also be used.

Proposal 6

Proposed texts for MEGC's in Part 4

The existing 4.2.4 should be renumbered as 4.2.5 and replaced by the following text.

4.2.4 General provisions for the use of multiple-element gas containers (MEGCs)

4.2.4.1 This section provides general requirements applicable to the use of multiple-element gas containers (MEGCs) for the transport of non-refrigerated gases.

4.2.4.2 MEGCs shall conform to the design, construction, inspection and testing requirements detailed in 6.7.7.5. The elements of MEGC's shall be periodically inspected according to the provisions set out in P200 in 4.1.4.1 and in 6.2.

4.2.4.3 During transport, MEGCs shall be adequately protected against damage to the elements and service equipment resulting from lateral and longitudinal impact and overturning. If the elements and service equipment are so constructed as to withstand impact or overturning they need not be protected in this way. Examples of such protection are given in **6.6.5.11.5**.

4.2.4.4 Toxic gases and gas mixtures classified under N.O.S. entries of Division 2.3 with an $LC_{50} < 200$ ppm] shall not be authorised for transport in MEGCs.

4.2.4.5 Empty MEGCs not cleaned and not gas-free shall comply with the same requirements as MEGCs filled with the previous gas.

4.2.4.6 Empty MEGC's, uncleaned may be moved after the expiration of the period for undergoing the test.

4.2.4.9 *Filling*

4.2.4.9.1 Prior to filling the shipper shall ensure that the MEGC is authorized for the gas to be transported.

4.2.4.9.2 Elements of MEGC's shall be filled according to the filling ratios determined in packing instruction P200 in 4.1.4.1

4.2.4.9.3 MECG's shall not be filled above their maximum permissible gross mass prescribed under section 6.7.5.13.

4.2.4.9.4 Toxic gases of division 2.3 shall only be transported in multiple-element gas containers where each element is equipped with an isolation valve. The isolation valves shall be closed after filling and remain closed during transport.

4.2.4.9.5 The opening(s) for filling shall be closed by caps or plugs. The leakproofness of the closures and equipment shall be verified by the consigner after filling.

4.2.4.10 MEGCs shall not be offered for transport:

(a) when leaking;

(b) when damaged to such an extent that the integrity of the elements, the lifting or securing arrangements may be affected; and

(c) unless the service equipment has been examined and found to be in good working order.

Proposal 7

Proposed texts for MEGC's in Part 6

6.7.5 Requirements for the design, construction, inspection and testing of multiple-element gas containers (MEGCs) intended for the transport of non-refrigerated gases

6.7.5.1 Definitions

For the purposes of this section:

*Element*s are restricted to cylinders, tubes or bundle of cylinders

Manifold means an assembly of piping and valves connecting the filling/discharge openings of the elements;

Service equipment means measuring instruments and filling, discharge, venting and safety devices;

Structural equipment means the reinforcing, fastening, protective and stabilizing members external to the elements;

bar:

or

be:

gas;

bar;]

Design pressure means the pressure to be used in calculations required by a recognized pressure vessel code or standard. The design pressure shall be not less than the test pressure.

Test pressure means the maximum gauge pressure of the elements during the pressure test;

Leakproofness test means a test using gas subjecting the elements and its service equipment to an effective internal pressure of not less than 20% of the test pressure;

Maximum permissible gross mass (MPGM) means the sum of the tare mass of the multiple-element gas container and the heaviest load authorized for transport;

Design reference temperature means the temperature determined for the purpose of calculating the MAWP for liquefied gases. This value is fixed at 65 °C.

6.7.5.2 ***General design and construction requirements***

6.7.5.2.1 The multiple-element gas container shall be capable of being loaded and discharged without the removal of its structural equipment. It shall possess stabilizing members external to the elements, and shall be capable of being lifted also when full. It shall be designed primarily to be loaded onto a transport vehicle or ship and shall be equipped with skids, mountings or accessories to facilitate mechanical handling.

6.7.5.2.2 MEGC's shall be designed, manufactured, tested and equipped in such a way as to withstand all conditions to wich they will subjected during their normal use and during normal transport conditions. The design shall take into account the effects of dynamic loading and fatigue.

6.7.5.2.3 Elements of a MEGC shall be made of seamless steel and be constructed according to section 6.2.

6.7.5.2.4 MEGCs, fittings and pipework shall be constructed of materials which are:

(a) substantially immune to attack by the gas(es) intended to be transported(see e.g. ISO 11114).; or

(b) properly passivated or neutralized by chemical reaction.

6.7.5.2.5 Contact between dissimilar metals which could result in damage by galvanic action shall be avoided.

6.7.5.2.6 The materials of the MEGC, including any devices, gaskets, and accessories, shall not adversely affect the gases intended for transport in the MEGC.

6.7.5.2.7 MEGCs shall be designed and constructed with supports to provide a secure base during transport and with suitable lifting and tie-down attachments.

6.7.5.2.8 MEGCs shall be designed to withstand, without loss of contents, at least the internal pressure due to the contents, and the static, dynamic and thermal loads during normal conditions of handling and transport. The design shall demonstrate that the effects of fatigue, caused by repeated application of these loads through the expected life of the multiple-element gas container, have been taken into account.

6.7.5.2.9 MEGCs and their fastenings shall, under the maximum permissible load, be capable of absorbing the following separately applied static forces:

(a) in the direction of travel: twice the MPGM multiplied by the acceleration due to gravity (g) */;

(b) horizontally at right angles to the direction of travel: the MPGM (when the direction of travel is not clearly determined, the forces shall be equal to twice the MPGM) multiplied by the acceleration due to gravity (g) */;

(c) vertically upwards: the MPGM multiplied by the acceleration due to gravity (g)*/, and

(d) vertically downwards: twice the MPGM (total loading including the effect of gravity) multiplied by the acceleration due to gravity (g) */.

6.7.5.2.10 Under the stresses defined above, the stress at the most severely stressed point of the elements shall not exceed the values given in the relevant standards of section 6.2.2 or if or, if the elements are not designed, constructed and tested according to those standards, in section 6.2.3.

6.7.5.2.11 Under each of the forces in 6.7.5.2.9, the safety factor for the framework and fastenings to be observed shall be as follows:

(a) for steels having a clearly defined yield point, a safety factor of 1.5 in relation to the guaranteed yield strength; or

(b) for steels with no clearly defined yield point, a safety factor of 1.5 in relation to the guaranteed 0.2% proof strength and, for austenitic steels, the 1% proof strength.

6.7.5.2.12 MEGC intended for the transport of flammable gases shall be capable of being electrically earthed.

6.7.5.2.13 The elements shall be secured in a manner that prevents undesired movement in relation to the structure and the concentration of local stresses.

6.7.5.3 ***Service equipment***

6.7.5.3.1 Service equipment shall be so arranged as to be protected against the risk of being wrenched off or damaged during handling and transport. When the connection between the frame and the elements allows relative movement between the sub-assemblies, the equipment shall be so fastened as to permit such movement without risk of damage to working parts. The manifolds, the discharge fittings (pipe sockets, shut-off devices), the stop-valves shall be protected against the danger of being wrenched off by external forces . Manifold piping leading to shut-off valves shall be suffciently flexible to protect the valves and the piping from shearing. The filling and discharge devices (including flanges or threaded plugs) and any protective caps shall be capable of being secured against unintended opening.

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*/ *For calculation purposes* $g = 9{,}81\ m/s^2$.

6.7.5.3.2 Each element intended for the transport of toxic gases division 2.3 shall be fitted with a valve. The manifold for liquefied toxic gases division 2.3 shall be so designed that the elements can be filled separately and be kept isolated by a valve capable of being sealed.
[The assembly of elements intended for the transport of flammable gases of division 2.1 shall be fitted with an isolation valve when the combined volume exceeds [3000] litres]

6.7.5.3.3 For filling and discharge openings of the MEGC two valves in series shall be placed in an accessible position on each discharge and filling pipe. One of the valves may be a non-return valve. The filling and discharge devices may be fitted to a manifold. For sections of piping which can be closed at both ends and where liquid product can be trapped a pressure-relief valve shall be provided to prevent excessive pressure build-up.

6.7.5.3.4 [For filling and discharge openings of MEGC intended for the transport of flammable and/or toxic liquefied gases the stop-valve shall be a quick closing safety device which closes automatically in the event of unintended movement of the MEGC during filling or discharge or fire engulfment. Except for MEGCs having a capacity of not more than 1 000 litres, it shall be possible to operate this device by remote control.]]

6.7.5.3.5 External fittings shall be grouped together at the ends so far as reasonably practicable.

6.7.5.3.6 Each valve on a multiple-element gas container shall be clearly marked to indicate its function.

6.7.5.3.7 Each stop-valve or other means of closure shall be designed and constructed to a burst pressure equal to or greater than the burst pressure of the elements. All stop-valves with screwed spindles shall close by a clockwise motion of the handwheel. For other stop-valves the position (open or closed) and direction of closure shall be clearly indicated. All stop-valves shall be designed and positioned to prevent unintentional opening.

6.7.5.3.8 Piping shall be designed, constructed and installed so as to avoid the risk of damage due to expansion and contraction, mechanical shock and vibration.

6.7.5.3.9 Joints in copper tubing shall be brazed or have an equally strong metal union. The melting point of brazing materials shall be no lower than 525 °C.

6.6.5.3.10 The rated pressure of the service equipment and of the manifold shall be not less than two thirds of the test pressure of the elements.

6.6.5.3.11 Ductile metals shall be used in the construction of valves or accessories.

6.7.5.4 Pressure-relief devices

6.7.5.4.1 MEGCs used for the transport of of non-flammable, non-toxic, high pressure liquefied gases may be provided with one or more pressure-relief devices. Every element or group of elements of a multiple-element gas container that can be isolated shall then be fitted with one or

more pressure relief-devices. The pressure-relief devices shall open automatically at a pressure between 100 and 120 percent of the test pressure. The pressure-relief devices shall be of a type that will resist dynamic forces including liquid surge (see for example CGA S-1.1-1994).

6.7.5.4.2 Pressure-relief devices, when fitted, shall be designed to prevent the entry of foreign matter, the leakage of gas and the development of any dangerous excess pressure.

6.7.5.4.3 MEGCs used for the transport of certain non-refrigerated gases identified in instructions T50 in 4.2.5.2.8 {shall/may} have a pressure-relief device approved by the competent authority. Unless a multiple-element gas container in dedicated service is fitted with an approved relief device constructed of materials compatible with the load, such device (shall) comprise a frangible disc preceding a spring-loaded device. The space between the frangible disc and the device may be provided with a pressure gauge or a suitable tell-tale indicator. This arrangement permits the detection of disc rupture, pinholing or leakage which could cause a malfunction of the pressure-relief device. The frangible discs shall rupture at a nominal pressure 10% above the start-to-discharge pressure of the spring-loaded relief device.

6.7.5.4.4 In the case of multi-purpose MEGCs used for the transport of low-pressure liquefiedgases, the pressure-relief devices shall open at a pressure indicated in 6.7.3.7.1 for the gas having the highest maximum allowable pressure of the gases allowed to be transported in the MEGC.

6.7.5.5 Capacity of relief devices

6.7.5.5.1 The combined delivery capacity of the relief devices when fitted shall be sufficient that, in the event of total fire engulfment, the pressure (including accumulation) inside the elements intended for the transport of gases does not exceed 120% of the set pressure of the relief device. Spring-loaded relief devices may be used to achieve the full relief capacity prescribed in the case of low pressure liquefied gases. In the case of multi-purpose elements, the combined delivery capacity of the pressure-relief devices shall be taken for the gas which requires the highest delivery capacity of the gases allowed to be transported in MEGCs.

6.7.5.5.2 To determine the total required capacity of the relief devices installed on the elements for the transport of low pressure liquefied gases, the thermodynamic properties of the gas have to be considered (see for example CGA S-1.2-1995).

6.7.5.5.3 To determine the total required capacity of the relief devices installed on the elements for the transport of high pressure liquefied gases, the thermodynamic properties of the gas have to be considered (see for example CGA S-1.1-1994).

6.7.5.6 Marking of pressure-relief devices

6.7.5.6.1 Spring loaded pressure-relief devices [shall be plainly and permanently marked with the following:

(a) the pressure (in bar or kPa) at which it is set to discharge;

(b) the allowable tolerance at the discharge pressure;

(c) the rated flow capacity of the device in standard cubic metres of air per second (m^3/s),

When practicable, the following information shall also be shown:

(d) the manufacturer's name and relevant catalogue number.

6.7.5.6.2 The rated flow capacity marked on the frangible disk shall be determined according to CGA S-1.1-1994.

6.7.5.6.3 The rated flow capacity marked on the pressure-relief devices for low pressure liquefied gases shall be determined according to ISO 4126-1:1996.

6.7.5.7 Connections to pressure-relief devices

6.7.5.7.1 Connections to pressure-relief devices shall be of sufficient size to enable the required discharge to pass unrestricted to the safety device. No stop-valve shall be installed between the element and the pressure-relief devices except when duplicate devices are provided for maintenance or other reasons and the stop-valves serving the devices actually in use are locked open or the stop-valves are interlocked so that at least one of the duplicate devices is always operable and capable of meeting the requirements of 6.6.5.6. There shall be no obstruction in an opening leading to a vent or pressure-relief device which might restrict or cut-off the flow from the element to that device. Vents from the pressure-relief devices, when used, shall deliver the relieved vapour or liquid to the atmosphere in conditions of minimum back-pressure on the relieving device.

6.7.5.8 Siting of pressure-relief devices

6.7.5.8.1 All pressure-relief devices shall under under maximum filling conditions be situated in the vapour space of the elements for the transport of liquefied gases.
The devices when fitted shall be so arranged as to ensure that the escaping vapour is discharged upwards and unrestrictedly. For flammable and oxidising gases, the escaping gas shall be directed away from the element in such a manner that it cannot impinge upon the other elements. Protective devices which deflect the flow of gas are permissible provided the required relief-device capacity is not reduced.

6.7.5.8.2 Arrangements shall be made to prevent access to the pressure-relief devices by unauthorized persons and to protect the devices from damage caused by the MEGC overturning.

6.7.5.9 Gauging devices

6.7.5.9.1 When a MEGC is intended to be filled by mass/weight it shall be equipped with one or more gauging devices. Level-gauges made of glass or other fragile material shall not be used.

6.7.5.10 MEGC supports, frameworks, lifting and tie-down attachments

6.7.5.10.1 MEGCs shall be designed and fabricated with a support structure to provide a secure base during transport. The forces specified in 6.7.5.2.8 and the safety factor specified in 6.7.5.2.9 shall be considered in this aspect of the design. Skids, frameworks, cradles or other similar structures are acceptable.

6.7.5.10.2 The combined stresses caused by element mountings (e.g. cradles, frameworks, etc.) and MEGC lifting and tie-down attachments shall not cause excessive stress in any element. Permanent lifting and tie-down attachments shall be fitted to all MEGCs. In no case shall mountings or attachments be welded onto the elements.

6.7.5.10.3 In the design of supports and frameworks the effects of environmental corrosion shall be taken into account.

6.7.5.10.4 When MEGCs are not protected during transport, according to 4.2.4.3, the elements and service equipment shall be protected against damage resulting from lateral or longitudinal impact or overturning. External fittings shall be protected so as to preclude the release of the elements contents upon impact or overturning of the MEGC on its fittings. Particular attention shall be paid to the protection of the manifold. [Examples of protection include:

(a) protection against lateral impact which may consist of longitudinal bars;

(b) protection against overturning which may consist of reinforcement rings or bars fixed across the frame;

(c) protection against rear impact which may consist of a bumper or frame;

(d) protection of the elements and service equipment against damage from impact or overturning by use of an ISO frame in accordance with [ISO 1496-3:1995](to be checked by MT).]

6.7.5.11 Design approval

6.7.5.11.1 The competent authority or its authorized body shall issue a design approval certificate for any new design of a MEGC. This certificate shall attest that the MEGC has been surveyed by that authority, is suitable for its intended purpose and meets the requirements of this Chapter and when appropriate the provisions for gases provided in instructions *P200 in 4.1.4 and , T50 and T60* in 4.2.5.2.8. When a series of MEGCs are manufactured without change in the design, the certificate shall be valid for the entire series. The certificate shall refer to the prototype test report,

the materials of construction of the manifold, the standards to which the elements are made and an approval number. The approval number shall consist of the distinguishing sign or mark of the State in whose territory the approval was granted, i.e. the distinguishing sign for use in international traffic, as prescribed by the Convention on Road Traffic, Vienna 1968, and a registration number. Any alternative arrangements according to 6.6.1.2 shall be indicated on the certificate. A design approval may serve for the approval of smaller MEGCs made of materials of the same kind and thickness, by the same fabrication techniques and with identical supports, equivalent closures and other appurtenances.

6.7.5.11.2 The prototype test report for the design approval shall include at least the following:

(a) the results of the applicable framework test specified in [ISO 1496-3:1995];

(b) the results of the initial inspection and test in 6.6.5.13.3;

(c) the results of the impact test in 6.6.5.12.1, when applicable [(see ISO 1496-3)];

and

(d) certification documents verifying that cylinders and tubes comply with the applicable standards.

6.7.5.12 Inspection and testing

6.7.5.12.1 For MEGCs meeting the definition of container in the CSC, a prototype representing each design shall be subjected to an impact test. The prototype MEGC shall be shown to be capable of absorbing the forces resulting from an impact not less than 4 times (4 g) the MPGM of the fully loaded portable tank at a duration typical of the mechanical shocks experienced in rail transport{by either calculation or impact test}. The following is a listing of standards describing methods acceptable for performing the impact test:

Association of American Railroads,
Manual of Standards and Recommended Practices,
Specifications for Acceptability of Tank Containers (AAR.600), 1992

Canadian Standards Association (CSA),
Highway Tanks and Portable Tanks for the Transportation of Dangerous Goods
(B620-1987)

Deutsche Bahn AG
Zentralbereich Technik, Minden
Portable tanks, longitudinal dynamic impact test

Société Nationale des Chemins de Fer Français
C.N.E.S.T. 002-1966.
Tank containers, longitudinal external stresses and dynamic impact tests

Spoornet, South Africa
Engineering Development Centre (EDC)
Testing of ISO Tank Containers
Method EDC/TES/023/000/1991-06

6.6.5.12.2 The elements and items of equipment of each MEGC shall be inspected and tested before being put into service for the first time (initial inspection and test). Thereafter MEGC shall be inspected at no more than five-year intervals An exceptional inspection and test shall be performed regardless of the last periodic inspection and test when necessary according to 6.6.5.13.7.

6.6.5.12.3 The initial inspection and test of a MEGC shall include a check of the design characteristics, an external examination of the MEGC and its fittings with due regard to the gases to be transported, and a pressure test referring to the test pressures according to 6.6.5.3.1. The pressure test may be performed as a hydraulic test or by using another liquid or gas with the agreement of the competent authority or its authorized body. Before the MEGC is placed into service, a leakproofness test and a test of the satisfactory operation of all service equipment shall also be performed. When the elements and their fittings have been pressure-tested separately, they shall be subjected together after assembly to a leakproofness test.

6.7.5.12.4 The 5 year periodic inspection shall include an and]external examination of the structure, the elements and the service equipment. The elements and the piping shall be tested as required in P200 and described in 6.2.1.5. When the elements and equipment have been pressure-tested separately, they shall be subjected together after assembly to a leakproofness test.

6.7.5.12.5 A MEGC shall not be filled and offered for transport after the date of expiry of the last periodic inspection and test as required by 6.7.5.13.2. However a MEGC filled prior to the date of expiry of the last periodic inspection and test may be transported for a period not to exceed three months beyond the date of expiry of the last periodic test or inspection. In addition, a MEGC may be transported after the date of expiry of the last periodic test and inspection:

(a) after emptying but before cleaning, for purposes of performing the next required test or inspection prior to refilling; or

(b) unless otherwise approved by the competent authority, for a period not to exceed six months beyond the date of expiry of the last periodic test or inspection, in order to allow the return of dangerous goods for proper disposal or recycling. Reference to this exemption shall be mentioned in the transport document.

The exceptional inspection and test is necessary when the MEGC shows evidence of damaged or corroded areas, or leakage, or other conditions that indicate a deficiency that could affect the integrity of the MEGC. The extent of the exceptional inspection and test shall depend on the amount of damage or deterioration of the MEGC. It shall include at least the inspection required under 6.7.5.12.6

6.7.5.12.6 The examinations shall ensure that:

(a) [the elements are inspected for pitting, corrosion, or abrasions, dents, distortions], defects in welds or any other conditions, including leakage, that might render the MEGC unsafe for transport;

(b) the piping, valves, and gaskets are inspected for corroded areas, defects, and other conditions, including leakage, that might render the MEGC unsafe for filling, discharge or transport;

(c) missing or loose bolts or nuts on any flanged connection or blank flange are replaced or tightened;

(d) all emergency devices and valves are free from corrosion, distortion and any damage or defect that could prevent their normal operation. Remote closure devices and self-closing stop-valves shall be operated to demonstrate proper operation;

(e) required markings on the MEGC are legible and in accordance with the applicable requirements; and

(f) the framework, the supports and the arrangements for lifting the portable tank are in satisfactory condition.

6.7.5.12.9 The inspections and tests in 6.7.5.13.1, 6.7.5.13.3, 6.7.5.13.4, 6.7.5.13.5 and 6.7.5.12.7 shall be performed or witnessed by a body authorized by the competent authority. When the pressure test is a part of the inspection and test, the test pressure shall be the one indicated on the data plate of the MEGC. While under pressure, the MEGC shall be inspected for any leaks in the elements, piping or equipment.

6.7.7.12.10 When evidence of any unsafe condition is discovered, the MEGC shall not be returned to service until it has been corrected and the applicable tests and verifications are passed.

6.7.5.13 Marking

6.6.5.13.1 Every MEGC shall be fitted with a corrosion resistant metal plate permanently attached to the MEGC in a conspicuous place readily accessible for inspection.The elements shall be marked with at least the information required by the pressure vessel code. As a minimum at least the following information shall be marked on the plate by stamping or by any other similar method.

[Country of manufacture

U Approval For Alternative Country "AA" Approval Arrangements

N Number

Manufacturer's name or mark

Manufacturer's serial number

Authorized body for the design approval

Owner's registration number

Year of manufacture

Test pressure _____bar/kPa gauge */

Maximum settled pressure at 15 °C_____bar/kPa gauge

Design temperature range_____ °C to_____ °C

Design reference temperature_____ °C

Number of elements_____

Total water capacity at 20° _C _____litres

Initial pressure test date and witness identification

Elements materials and material standard references

Date and type of most recent periodic tests

Month_____ Year_____ Test pressure_____bar/kPa gauge */

Stamp of expert who performed or witnessed the most recent test]

***NOTE**: No metal plate may be fixed to the elements.*

[6.6.5.13.2 The following information shall be marked on a metal plate firmly secured to the MEGC:

Name of the operator

Name of gas(es) permitted for transport

Maximum permissible load mass_____kg

Maximum permissible load mass per element (liquefied gas only)_____kg

Maximum permissible gross mass (MPGM)_____kg

Unladen (tare) mass_____kg

***NOTE**: For the identification of the gases being transported, see also Part 5.]"*

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*/ *The unit used shall be marked.*

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COMMITTEE OF EXPERTS ON THE TRANSPORT
OF DANGEROUS GOODS

Sub-Committee of Experts on the
Transport of Dangerous Goods

REPORT OF THE SUB-COMMITTEE OF EXPERTS ON ITS SIXTEENTH SESSION

(Geneva, 5-14 July 1999)

Addendum 2

Annex 2

Draft amendments to the Model Regulations annexed to the eleventh revised edition of the United Nations Recommendations on the Transport of Dangerous Goods (Refer to ST/SG/AC.10/1/Rev.11)

GE.99- 22849

DRAFT AMENDMENTS TO THE MODEL REGULATIONS ANNEXED TO THE ELEVENTH REVISED EDITION OF THE UNITED NATIONS RECOMMENDATIONS ON THE TRANSPORT OF DANGEROUS GOODS
(Refer to ST/SG/AC.10/1/Rev.11)

Chapter 1.2

1.2.1 Add the following definition:

"Aerosols or aerosols dispensers are non-refillable receptacles meeting the requirements of 6.2.2, made of metal, glass or plastics and containing a gas compressed, liquefied or dissolved under pressure, with or without a liquid, paste or powder, and fitted with a release device allowing the contents to be ejected as solid or liquid particles in suspension in a gas, as a foam, paste or powder or in a liquid state or in a gaseous state."

Chapter 2.0

2.0.1.3 Amend to read as follows:

"2.0.1.3 For packing purposes, substances of all classes, other than Classes 1, 2, and 7, divisions 5.2 and 6.2 and the self-reactive substances of division 4.1, are assigned to three packing groups in accordance with the degree of danger presented by the substance. The packing groups have the following meanings:

Packing Group I: Substances presenting high danger,
Packing Group II: Substances presenting medium danger, and
Packing Group III: Substances presenting low danger,

The packing group to which a substance is assigned is indicated in the Dangerous Goods List in Chapter 3.2."

Chapter 2.1

2.1.3.1.2 (d) Delete.

2.2.1.1 Add the following Note:

"***Note**: Carbonated beverages are not subject to these Regulations.*"

2.2.2.1 Under the Note, insert "(GAS CARTRIDGES)" after "UN 2037 RECEPTACLES, SMALL, CONTAINING GAS".

Chapter 2.4

Introductory Note 3 Delete.

2.4.2.3.2.3 Add the following entries to read:

Self-reactive Substance	Concentration (%)	Packing method	Control temperature (°C)	Emergency temperature (°C)	UN generic entry	Remarks
2-DIAZO-1-NAPHTHOL-4-SULPHONIC ACID ESTER	100%	OP7			3226	
2-DIAZO-1-NAPHTHOL-5-SULPHONIC ACID ESTER	100%	OP7			3226	
2,5-DIETHOXY-4-(4-MORPHOLINYL)-BENZENEDIAZONIUM SULPHATE	100%	OP7			3226	
4-(DIMETHYLAMINO)-BENZENEDIAZONIUM, TRICHLOROZINCATE (-1)	100%	OP8			3228	
2,5-DIBUTOXY-4-(4-MORPHOLINYL)-BENZENEDIAZONIUM, TETRACHLOROZINCATE (2:1)	100%	OP8			3228	

Chapter 2.6

2.6.3.3 Delete "and clinical or (bio)medical waste" in the title.

2.6.3.3.3 Delete.

Chapter 2.8

2.8.1 Delete "they may also cause other hazards".

Chapter 3.1

3.1.2.6 Add a new paragraph 3.1.2.6 to read as follows:

"3.1.2.6 Except for self-reactive substances and organic peroxides and unless it is already included in capital letters in the name indicated in the Dangerous Goods List, the word STABILIZED shall be added as part of the proper shipping name of a substance which without stabilization would be forbidden from transport in accordance with 1.1.3 due to it being liable to dangerously react under conditions normally encountered in transport."
(e.g. TOXIC LIQUID, ORGANIC, N.O.S., STABILIZED)

3.1.2.7 Add a new paragraph to read as follows:

"3.1.2.7 Hydrates may be included under the proper shipping name for the anhydrous substance."

Renumber consequently following paragraphs and sub-paragraphs.

Chapter 3.2

3.2.1 Under the explanation of column (2), delete "of organic substances" in the last sentence.

DANGEROUS GOODS LIST

UN 0015 Delete "8" in column (4).

UN 0016 Delete "8" in column (4).

UN 0303 Delete "8" in column (4).

UN 0331 Add "(AGENT, BLASTING, TYPE B)" in column (2). (English text only)

UN 0332 Add "(AGENT, BLASTING, TYPE B)" in column (2). (English text only)

UN 1062 Amend the name in column (2) to read as follows:

"METHYL BROMIDE with not more than 2% chloropicrin"

UN 1381 Insert "TP31" in column (11).

UN 1422 Insert "TP31" in column (11).

UN 1428 Insert "TP31" in column (11).

UN 1556 Insert "T14" in column (10) and insert "TP2", "TP9", "TP13" and "TP27" in column (11) for PG I.

Insert "T11" in column (10) and insert "TP2", "TP13" and "TP27" in column (11) for PG II.

Insert "T7" in column (10) and insert "TP2" and "TP28" in column (11) for PG III.

UN 1581 Amend the name in column (2) to read as follows:

"CHLOROPICRIN AND METHYL BROMIDE MIXTURE with more than 2% chloropicrin"

UN 2030 Amend to read as follows:

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
2030	HYDRAZINE HYDRATE, or HYDRAZINE AQUEOUS SOLUTION, with not less than 37% hydrazine, by mass	8	6.1	I	298	NONE			T20	TP2 TP13
		8	6.1	II		500 ml			T15	TP2 TP13
		8	6.1	III		1 L			T4	TP2

UN 2216 Insert special provision "300" in column (6).

UN 2257 Insert "TP31" in column (11).

UN 2531 Insert "TP30" in column (11).

UN 2579 Insert "TP30" in column (11).

UN 2680 Amend the name in column (2) to read as follows:

"LITHIUM HYDROXIDE"

UN 2740 Insert "T20" in column (10) and insert "TP2" and "TP13" in column (11).

UN 3166 Amend the name in column (29 to read as follows:

"ENGINE, INTERNAL COMBUSTION or VEHICLE FLAMMABLE GAS, POWERED or VEHICLE FLAMMABLE LIQUID, POWERED"

UN 3221 Replace "NONE" with "25 ml" in column (7).

UN 3222 Replace "NONE" with "100 g" in column (7).

UN 3223 Replace "NONE" with "25 ml" in column (7).

UN 3224 Replace "NONE" with "100 g" in column (7).

UN 3225 Replace "NONE" with "125 ml" in column (7).

UN 3226 Replace "NONE" with "500 g" in column (7).

UN 3227 Replace "NONE" with "125 ml" in column (7).

UN 3228 Replace "NONE" with "500 g" in column (7).

UN 3229 Replace "NONE" with "125 ml" in column (7).

UN 3230 Replace "NONE" with "500 g" in column (7).

UN 3270 Replace "NONE" with "500 g" in column (7).

2 Add the following new entries:

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1372	FIBRES, ANIMAL or FIBRES, VEGETABLE burnt, wet or damp	4.2		III	117	NONE	P410			
1387	WOOL WASTE, WET	4.2		III	117	NONE	P410			
1856	RAGS, OILY	4.2			29 117	NONE	P003 IBC08	PP19 B6		
1857	TEXTILE WASTE, WET	4.2		III	117	NONE	P410			
3359	CARGO TRANSPORT UNIT UNDER FUMIGATION	9			29 [XXX]	NONE	NONE			
3360	FIBRES, VEGETABLE, DRY	4.1			29 117 299	NONE	P003	PP19		
3361	CHLOROSILANES, TOXIC, CORROSIVE, N.O.S.	6.1	8	II	109	NONE	P001 IBC01		T11	TP2 TP13
3362	CHLOROSILANES, TOXIC, CORROSIVE, FLAMMABLE, N.O.S.	6.1	3, 8	II	109	NONE	P001 IBC01		T11	TP2 TP13
3363	DANGEROUS GOODS IN MACHINERY or DANGEROUS GOODS IN APPARATUS	9			301	NONE	P907			

Chapter 3.3

Section 3.3.1

Special provisions

SP 109 Delete.

SP 117 Delete the two last sentences [replaced by SP 300 for UN 2216].

SP 119 Add "and refrigerating machine components" after "Refrigerating machines" in the second sentence.

SP 162 Replace "23 °C with "60.5 °C".

SP 190 Delete the first sentence.

SP 191 Replace "see Special Provision 190" with "Receptacles with a capacity not exceeding 50 ml containing only non-toxic constituents are not subject to these Regulations."

SP 196 Amend to read as follows:

"196 Formulations which in laboratory testing neither detonate in the cavitated state or deflagrate, which show no effect when heated under confinement and which exhibit no explosive power may be transported under this entry. The formulation must also be thermally stable (i.e. the SADT is 60 °C or higher for a 50 kg package). Formulations not meeting these criteria shall be transported under the provisions of Division 5.2, see 2.5.3.2.4."

SP 235 Delete the last sentence.

SP 265 Delete.

SP 268 Delete.

SP 291 Add "and refrigerating machine components" after "Refrigerating machines" in the fourth sentence.

SP 298 Add the following new special provision:

"298 Solutions with a flash point of 60.5 °C or less shall bear a flammable liquid label."

SP 299 Add the following new special provision:

"299 Consignments of COTTON, DRY having a density not less than 360 kg/m³ according to ISO 8115:1986 are not subject to these Regulations when carried in closed transport units."

SP 300 Add the following new special provision:

"300 Fish meal or fish scrap shall not be transported if the temperature at the time of loading exceeds 35 °C or 5 °C above the ambient temperature whichever is higher. Fish scrap or fish meal shall contain at least 100 ppm of anti-oxidant (ethoxyquin) at the time of consignment."

SP 301 Add the following new special provision:

"301 This entry only applies to machinery or apparatus containing dangerous substances as a residue or an integral element of the machinery or apparatus. It shall not be used for machinery or apparatus for which a proper shipping name already exists in the Dangerous Goods List. Machinery and apparatus transported under this entry shall only contain dangerous goods which are authorized to be transported in accordance with the provisions in Chapter 3.4 (Limited quantities). The quantity of dangerous goods in machinery or apparatus shall not exceed the quantity specified in column 7 of the Dangerous Goods List for each item of dangerous goods contained. If the machinery or apparatus contains more than one item of dangerous goods, the individual substances shall not be capable of reacting dangerously with one another (see 4.1.1.6). When it is required to ensure liquid dangerous goods remain in their intended orientation, package orientation labels meeting the specifications of ISO 780:1985 shall be affixed on at least two opposite vertical sides with the arrows pointing in the correct direction. The competent authority may exempt from regulation machinery or apparatus which would otherwise be transported under this entry."

Chapter 4.1

Introductory Note 1 Delete.

Introductory Note 2 Delete.

4.1.1.15 Add the following new paragraph:

"4.1.1.15 Explosives, self-reactive substances and organic peroxides

Unless specific provision to the contrary is made in these Regulations, the packagings, including IBCs and large packagings, used for goods of Class 1, self-reactive substances of Division 4.1 and organic peroxides of Division 5.2 shall comply with the provisions for the medium danger group (Packing group II)."
Renumber following paragraph and sub-paragraphs accordingly.

4.1.4.1 Add "1856" and "3360" in PP19 under the heading "special packing provisions" for packing instruction P003.

Add "plywood (1D)" in column "outer packaging" under "Drums" for the following packing instructions:

P112 (a), P112(b), P112(c), P113, P116, P130, P131, P134, P135, P136, P138, P140, P141 and P142.

Add "plastics, removable head (1H2)" in column "outer packaging" under "Drums" for the following packing instructions:

P112(c), P113, P115, P134, P138 and P140.

Add "fibreboard (1G)" in column "outer packaging" under "Drums" for the following packing instructions :

P134 and P138.

Add "steel, removable head (1A2)", "aluminium, removable head (1B2)" and "plastics, removable head (1H2)" in column "outer packaging" under "Drums" for packing instruction P144.

Add "aluminium (4B)" in column "outer packaging" under "Boxes" for packing instuctions P112 (c) and P113.

Add "plastics, solid (4H2)" in column "outer packaging" under "Boxes" for packing instruction P144.

Add the following new packing instruction:

"

P907	PACKING INSTRUCTION	P907

If the machinery or apparatus is constructed and designed so that the receptacles containing the dangerous goods are afforded adequate protection, an outer packaging is not required. Dangerous goods in machinery or apparatus shall otherwise be packed in outer packagings constructed of suitable material of adequate strength and design in relation to the packaging capacity and its intended use, and meeting the applicable requirements of 4.1.1.1.

Receptacles containing dangerous goods shall conform to the general provisions in 4.1.1, except that 4.1.1.3, 4.1.1.4, 4.1.1.12 and 4.1.1.14 do not apply. For Division 2.2 gases, the inner cylinder or receptacle, its contents and filling density shall be to the satisfaction of the competent authority of the country in which the cylinder or receptacle is filled.

In addition, the manner in which receptacles are contained within the machinery or apparatus, shall be such that under normal conditions of transport, damage to receptacles containing the dangerous goods is unlikely; and in the event of damage to receptacles containing solid or liquid dangerous goods, no leakage of the dangerous goods from the machinery or apparatus is possible (a leakproof liner may be used to satisfy this requirement). Receptacles containing dangerous goods shall be so installed, secured or cushioned as to prevent their breakage or leakage and so as to control their movement within the machinery or apparatus during normal conditions of transport. Cushioning material shall not react dangerously with the content of the receptacles. Any leakage of the contents shall not substantially impair the protective properties of the cushioning material.

"

Chapter 4.2

4.2.4.3 Add new portable tank special provisions "TP30" and "TP31" to read as follows:

"TP30 This substance shall be transported in insulated tanks.
TP31 This substance may only be transported in tanks in the solid state."

Chapter 5.4

5.4.1.1.3 Amend the end of this paragraph to read as follows:

"... preceded by the word "WASTE" unless this is already part of the proper shipping name."

5.4.2.1 (f) Replace the reference "7.1.3.2.1" with "7.1.3.3.1".

5.4.3.2 Replace the reference "7.1.3.2.1 (b)" with "7.1.3.3.1 (b)".

Chapter 6.1

Introductory Note 1 Delete.

Introductory Note 2 Delete.

Introductory Note 3 Delete.

6.1.1.4 Add "reconditioned", after "manufactured" and delete "manufactured" after "each".

6.1.2.3 Delete "and infectious substances packagings marked in accordance with 6.3.1.1,".

6.1.3 Under Note 3, replace three times "Group" with "Packing Group".

6.1.3.2 Amend to read as follows:

"6.1.3.3 Every packaging other than those referred in paragraph 6.1.3.2 liable to undergo a reconditioning process shall bear the marks indicated in 6.1.3.1 (a) to (e) in a permanent form. Marks are permanent if they are able to withstand the reconditioning process (e.g. embossed). For packagings other than metal drums of a capacity greater than 100 litres, these permanent marks may replace the corresponding durable markings prescribed in 6.1.3.1."

6.1.3.2.1, 6.1.3.2.2 and 6.1.3.2.3 Renumber these paragraphs as 6.1.3.2, 6.1.3.4 and 6.1.3.5 respectively.

Renumber the following paragraphs accordingly.

6.1.3.3 Amend this paragraph to read as follows:

"6.1.3.3 Marking shall be applied in the sequence of the sub-paragraphs in 6.1.3.1; each element of the marking required in these sub-paragraphs and when appropriate sub-paragraphs (h) to (j) of 6.1.3.4 shall be clearly separated, e.g. by a slash or space, so as to be easily identifiable.

For examples, see 6.1.3.6.

Any additional markings authorized by a competent authority shall still enable the parts of the mark to be correctly identified with reference to 6.1.3.1."

6.1.3.4 (ii) Amend to read as follows:

"(ii) the name of the reconditioner or other identification of the packaging specified by the competent authority."

6.1.4.8.2 Replace “is” with “may not exceed” in the second line of this paragraph.

6.1.5.2.5 Amend last sentence to read as follows:

"The minimum height of the stack including the test sample shall be 3 metres."

6.1.5.6.2 Delete "non-dangerous" after "are" in the first sentence.

Chapter 6.3

6.3.1.1 Replace "may, after decision by the competent authority," with "shall" and add the following sentence, at the end:

"Each element of the marking applied in accordance with sub-paragraphs (a) to (g) shall be clearly separated, e.g. by a slash or space, so as to be easily identifiable "

Chapter 6.5

6.5.2.1.1 At the end, add the following sentence:

"Each element of the marking applied in accordance with sub-paragraphs (a) to (h) and with 6.5.2.2 shall be clearly separated, e.g. by a slash or space, so as to be easily identifiable."

6.5.3.3.6 Delete.

6.5.3.4.10 Delete and renumber the following paragraphs.

Chapter 6.6

6.6.1.3 Add the following new paragraph:

"6.6.1.3 The requirements for large packagings in 6.6.4 are based on large packagings currently used. In order to take into account progress in science and technology, there is no objection to the use of large packagings having specifications different from those in 6.6.4 provided they are equally effective, acceptable to the competent authority and able successfully to withstand the tests described in 6.6.5. Methods of testing other than those described in these Regulations are acceptable provided they are equivalent."

6.6.2.1 Add the following new paragraph:

"6.6.2.1 The letter "W" may follow the Large Packaging code. The letter "W" signifies that the large packaging, although of the same type indicated by the code, is manufactured to a specification different from those in section 6.6.4 and is considered equivalent in accordance with the requirements in 6.6.1.3."

6.6.3.1 At the end, add the following sentence:

"Each element of the marking applied in accordance with sub-paragraphs (a) to (h) shall be clearly separated, e.g. by a slash or space, so as to be easily identifiable."

Chapter 7.1

7.1.2.1 Add "... and 7.1.3.2" at the end of the last sentence.

7.1.3.2 Add the following new section:

"**7.1.3.2** ***Mixed carriage of goods of Class 1 with dangerous goods of other classes in freight containers, vehicles and wagons***

7.1.3.2.1 Except where otherwise specially provided for in these Regulations, goods of Class 1 shall not be transported together in freight containers, vehicles and wagons with dangerous goods of other classes.

7.1.3.2.2 Goods in Division 1.4S may be transported together with dangerous goods of other classes.

7.1.3.2.3 Blasting explosives (except EXPLOSIVE, BLASTING, TYPE C, UN No. 0083) may be transported together with ammonium nitrate and inorganic nitrates of Class 5.1 */ provided the aggregate is treated as blasting explosives under Class 1 for the purpose of placarding, segregation, stowage and maximum permissible load.

7.1.3.2.4 Life saving appliances (UN 3072 and UN 2990) containing Class 1 goods as equipment may be transported together with the same dangerous goods as contained in the appliances.

7.1.3.2.5 Air bag inflators, pyrotechnic or air bag modules, pyrotechnic or seat-belt pretensioners, pyrotechnic of Division 1.4G may be transported with air bag inflators or air bag modules or seat-belt pretensioners of Classes 2 or 9."

Renumber the following paragraphs.

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*/ *Reference to UN numbers will be added when the revision of entries for ammonium nitrate fertilizers has been completed.*

Appendix A and Index

1. Amend as appropriate Appendix A and the alphabetical index in accordance with the amendments adopted for Chapter 3.2.

2. Add the following entry in the alphabetical index:

"Battery, lithium, see	9	3090
	9	3091"